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BULLETIN No. 289. JANUARY, 1913

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30 41, 13th, 11 A.; 14th, 10 A.
Minimum reduced to freezing, 28.25, 3d, 6 P.
Reduced† maximum reading, 30.73, 13th, 11 A.; 14th, 10 A.
Reduced† minimum reading, 28.55, 3d, 6 P.
Mean semi-daily reduced, ... 30.096
Monthly range, ... 2.18

***Air Temperature.** In Degrees Fahr.

Highest, ... 59.5, 3d, 2:30 P.
Lowest, ... 11.0, 9th, 7:30 A.
Mean hourly, ... 33.6
Mean of means of max. and min., ... 34.2
Mean sensible (wet bulb), ... 30.2
Monthly range, ... 48.5
Highest mean daily, ... 46.2, 18th
Lowest mean daily, ... 16.8, 9th
Mean maximum, ... 43.0
Mean minimum, ... 25.3
Mean daily range, ... 17.7
Greatest daily range, ... 35.5, 12th
Least daily range, ... 7.0, 4th

Humidity.

Mean dew point, ... 25.9
Mean force of vapor, ...192
Mean relative humidity, ... 79.0

Precipitation. In inches.

Total precipitation, ... 3.98
Number of days on which .01 inch or more rain fell, ... 15
Total snow in inches 4.0

*Temperature in ground shelter.
Reduced to freezing and sea-level.

Wind.

Total movement, ... 5359m.
Greatest daily movement, ... 642m., 4th
Least daily movement, ... 14m., 2d
Mean daily movement, ... 172 m
Mean hourly velocity, ... 7.2 m
Maximum pressure per square foot, 18.0 lbs.= 60m. per hour, 3d, 3 P., S.W.
Maximum velocity for 5 minutes, 48 m. per hour, 3d, 3 P., S.W.
Prevailing Direction, Southwest.

Summary.

West Northwest	13 per cent
South	10 " "
South Southwest	13 " "
Southwest	23 " "
South Southeast	10 " "
Other directions	31 " "

Weather.

Mean cloudiness observed, ... 63 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 115 hrs.=39 per cent.
Number of clear days, ... 13
Number of fair days, ... 10
Number of cloudy days, ... 8

Bright Sunshine.

Number of hours recorded, . . 179 hrs=61%.
Rain, 2d, 3d, 5th, 6th, 7th, 8th, 11th, 12th, 15th, 16th, 17th, 18th, 21st, 23d, 27th, 31st.
Snow, 4th, 7th, 23d, 29th.
Hail, 6th, 15th, 18th.
Thunder and Lightning, 18th, 31st.
Days of Sleighing, none.
Gales, 35 or more miles per hour: 60 m, 3d, S.W.; 54m., 4th, S.W.; 37m., 8th, W.N.W.; 49 m., 12th, W., 58 m., 18th, W.S.W.; 36 m., 21st, W.; 39 m.. 31st, S.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. of Hours Bright Sunshine
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper	Mean Sensible Wet Bulb.	
1	30.28	29.85	30.070	45.5	3 P	30.0	12 P	37.7	38.0	31.7	8.2
2	30.31	29.78	30.128	43.5	3:30 P	23.5	8:30 A	33.5	31.9	28.3	8.3
3	29.78	28.55	28.920	59.5	2:30 P	31.5	12 P	45.5	38.5	36.5	3.3
4	29.95	28.68	29 468	39.0	5:30 A	32.0	12 P	35.5	35.1	29.3	6.5
5	30.59	29.95	30.448	36.5	3 P	29.0	9 A	32.7	32.0	27.7	7.8
6	30.56	30.19	30.375	49.0	12 P	31.5	0 A	40.3	37.1	35.3	3.6
7	30.22	30.05	30.192	51.0	3 A	32.0	12 P	41.5	39.5	36.5	0.0
8	30.29	29.64	29.902	35.5	3 P	16.0	12 P	25.7	29.5	24.7	0.0
9	30.71	30.29	30.668	26.5	3:30 P	11.0	7:30 A	18.7	16.8	12.0	8.5
10	30.55	30.22	30.366	36.5	2 P	18.0	0 A	27.3	29.0	26.3	8.3
11	30.22	29.79	30.011	43.0	12 P	33.0	0 A	38.0	38.3	37.7	4.8
12	30.41	29.48	29.902	55.0	11:30 A	19.5	12 P	37.3	39.0	35.7	0.0
13	30.73	30.41	30.707	23.0	4 P	13.0	7:30 A	18.0	17.8	14.5	7.8
14	30.73	30.63	30.711	35.0	4 P	14.0	8 A	24.5	23.1	17.5	8.5
15	30.65	30.33	30.479	41.0	3 P	25.5	0 A	33.3	33.5	31.3	6.2
16	30.33	30.27	30.299	45.5	3 P	35.0	12 P	40.3	39.3	37.0	5.5
17	30.31	29.95	30.052	50.0	3:30 P	35.0	0 A	42.5	43.1	42.5	1.5
18	29.95	29.55	29.776	51.0	6 P	39.0	12 P	45.0	46.2	43.0	4.0
19	30.33	29.71	30.237	41.5	2 P	26.0	12 P	33.7	34.3	28.7	8.7
20	30.36	29.74	30.181	48.0	12 P	24.0	8 A	36.0	35.2	32.7	8.0
21	30.28	29.61	30.094	54.5	4 A	23.0	12 P	38.7	37.1	29.7	6.7
22	30.44	30.28	30.373	38.5	3 P	19.0	7 A	28.7	27.5	23.7	8.8
23	30.43	29.79	30.120	45.0	10:30 P	22.0	5 A	33.5	30.9	32.5	0.0
24	30.02	29.79	29.965	42.5	0 A	31.0	12 P	36.7	37.7	33.3	7.0
25	29.97	29.86	29.911	43.0	3 P	27.0	8 A	35.0	33.0	27.3	8.8
26	29.95	29.58	29.805	50.0	3 P	27.5	5 A	38.7	38.5	33.7	8.0
27	29.69	29.42	29.518	43.0	0 A	25.0	12 P	34.0	35.7	32.3	1.5
28	30.15	29.69	30.000	32.0	2:30 P	20.5	5 A	26.3	25.3	21.7	7.2
29	30.38	30 15	30.326	30.0	2 P	15.5	7:30 A	22.7	23.0	19.7	7.0
30	30.20	30.11	30.161	43.0	3 P	25.5	0 A	34.3	33 2	30.5	8.0
31	30.13	29.48	29.819	56.0	3 P	30.5	2 A	43.3	43.8	44.0	6.7

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DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	28.0	.194	80.5	W.N.W.	121	1.5	17	3 P				
2	26.0	.164	86 5	N.N.E.	14	0.0	—	—	11 P	12 P	T	
3	32.5	.234	81.5	S.	290	18.0	60	3 P	0 A	1:30 P	.55	
4	18.0	.199	52.5	S.W.	642	14.5	54	3 P	11 A	1 P	T	T
5	21.5	.170	68.5	W.N.W.	196	1.5	17	4 A	11 P	12 P	.01	
6	31.0	.233	76.5	E.S.E.	20	0.0	—	—	0 A	1 A	.01	
7	34.5	.228	88.5	N.E.	99	0.5	10	11 A	9:30 A	12 P	.59	1
8	12.0	.153	60.5	S.S.W.	138	7.0	37	6 P	0 A	2 P	1.02	
9	1.0	.088	55.0	W.S.W.	188	1.5	17	4 A				
10	23.0	.157	80.5	S.	205	0.5	10	8 A				
11	37.0	.233	95.5	S.	141	0.0	—	—	3 A	12 P	.20	
12	31.5	.242	79.5	S.W.	372	12.0	49	5 P	0 A	3 P	.14	
13	9.0	.094	72.0	N.W.	187	4.0	28	1 A				
14	10.5	.113	67.5	W.	47	0.5	10	12 P				
15	29.0	.191	84.0	S.S.E.	238	2.0	20	4 P	8 P	12 P	.01	
16	36.0	.229	92.0	S.W.	111	1.0	14	0 A	0 A	2 A	T	
17	42.0	.275	98.0	S.S.E.	81	0.0	—	—	3 A	8 P	.52	
18	39.5	.300	83.5	S.W.	168	17.0	58	10 P	3 P	11 P	.11	
19	24.0	.171	75.5	W.N.W.	313	5.0	32	0 A				
20	30.5	.216	84.5	S.S.W.	76	1.5	17	8 P				
21	25.0	.188	73.5	W.	394	6.5	36	5 A	1 A	6 A	.14	
22	20.0	.137	84.0	S.W.	75	0 0	—	—				
23	31.5	.198	92.0	S.S.E.	47	1.5	17	8 P	11 A	9 P	.28	1
24	29.5	.207	79.0	S.W.	116	0.0	—	—				
25	24.5	.159	84 5	E.	68	1.0	14	1 P				
26	28.5	.224	73.5	S.S.W.	138	2.0	20	11 P				
27	27.5	.203	78.0	N.W.	247	2.5	22	6 P	8 A	11 A	.02	
28	15.0	.131	68.5	W.N.W.	212	2.0	20	1 P				
29	14.5	.118	75.5	E.	61	0.0	—	—	2 P	11 P	.18	2
30	28.0	.179	85.0	S.S.W.	91	0.0	—	—				
31	43.0	.310	93.5	S.W.	263	7.5	39	10 P	9:30 P	11 P	.20	

**Rain or melted snow at base of tower. *Included in following day.

APR 1921

REMARKS

The weather during January was most unseasonable in its temperature, and exceptional in its barometric pressure. Throughout the month the weather conditions resembled the normal conditions of March much more closely than those of January. The absence of snow on the ground, excepting for short periods, tended to increase the resemblance to early spring rather than midwinter weather.

A comparison of the records of the various weather elements with those of former years shows the following interesting features: The mean barometer was higher than the normal, and the range of pressure was the largest ever noted for a single month at this station. The minimum barometer, on the third, was the lowest recorded here since this station was established. The minimum for Feb., 1895, of 28.56 inches was, however, but one one-hundredth of an inch higher than this month's record.

The mean temperature for the month broke all records for January, at Amherst, back to 1836—as far back as our records extend. The average temperature was more than 10° higher than the normal and, taken in connection with the unusually high temperature of the preceding month, makes a record for an "open winter" up to this date that has not been approached during the last 75 years. The mean temperature of the past two months was more than 8 degrees above the average value for that period.

The mean dew point was more than eight degrees above the normal, and the relative humidity slightly greater than usual.

The total precipitation was more than one-half an inch greater than the normal, and practically all of it occurred as rain.

The total wind movement was considerably more than usual, and the daily movement on the 4th, following the low barometer of the 3d, was one of our largest daily records here. The prevailing direction of the wind was rather unusual for this season of the year.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

BULLETIN No. 290. FEBRUARY, 1913

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.11, 2d, 11 A.; 10th, 11 A.
Minimum reduced to freezing, 29.25, 23d, 1 A.
Reduced† maximum reading, 30.44, 10th, 11 A.;
Reduced† minimum reading, 29.56, 23d, 1 A.
Mean semi-daily reduced, ... 30.008
Monthly range, ... 0.88

***Air Temperature.** In Degrees Fahr.

Highest, ... 55.0, 21st, 3 P.
Lowest, ... -4.5, 10th, 7:30 A.
Mean hourly, ... 22.7
Mean of means of max. and min., ... 22.7
Mean sensible (wet bulb), ... 19.4
Monthly range, ... 59.5
Highest mean daily, ... 41.5, 21st
Lowest mean daily, ... 7.1, 10th
Mean maximum, ... 32.2
Mean minimum, ... 13.3
Mean daily range, ... 18.9
Greatest daily range, ... 34.5, 11th
Least daily range, ... 7.5, 22d

Humidity.

Mean dew point, ... 14.1
Mean force of vapor, ...125
Mean relative humidity, ... 74.5

Precipitation. In inches.

Total precipitation, ... 2.94
Number of days on which .01 inch or more rain fell, ... 7
Total snow in inches 11.0

*Temperature in ground shelter.
Reduced to freezing and sea-level.

Wind.

Total movement, ... 5194m.
Greatest daily movement, ... 445m., 1st
Least daily movement, ... 23m., 11th
Mean daily movement, ... 185 m
Mean hourly velocity, ... 7.7 m
Maximum pressure per square foot, 13.5 lbs.= 52m. per hour, 1st, 1P., W.N.W.
Maximum velocity for 5 minutes, 36 m. per hour, 1st, 3 P., W.N.W.
Prevailing Direction, West.

Summary.

West . . . . . 18 per cent,
West Northwest . . . . . 18 " "
Northwest . . . . . 18 " "
Southwest . . . . . 14 " "
South . . . . . 11 " "
Other directions . . . . . 21 " "

Weather.

Mean cloudiness observed, ... 42 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 91 hrs.=31 per cent.
Number of clear days, ... 13
Number of fair days, ... 11
Number of cloudy days, ... 4

Bright Sunshine.

Number of hours recorded, . . 205 hrs=69%.
Rain, 21st, 22d, 27th, 28th.
Snow, 1st, 3d, 8th, 11th, 16th, 17th, 23d, 26th, 27th.
Thunder and Lightning, 22d.
Days of Sleighing, 15.
Gales, 35 or more miles per hour: 52 m, 1st, W.N.W.; 39m, 8th, W.S.W.; 36m., 9th, W.; 50m. 12th, W.N. W., 36 m., 23d, W.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. of Hours Bright Sunshine
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.24	29.58	29.899	32.5	10 A	16.5	12 P	24.5	26 4	21.7	8 5
2	30.43	30.24	30.376	28.0	4 P	14.0	5 A	21.0	20.3	18.5	9.3
3	30.32	29.67	29.948	29.0	9 P	20.0	3 A	24 5	25.5	25.5	2.8
4	29.90	29.68	29 879	31.0	2 P	12.0	12 P	21.5	24.1	20.3	9.0
5	29.93	29 82	29.877	20.0	3 P	7.0	12 P	13.5	15.2	14.5	9.0
6	29.92	29.78	29.882	17.0	1 P	5.0	1 A	11.0	11.5	9.0	8.0
7	29.97	29.84	29.934	21.0	3 P	3.0	5 A	12.0	12.5	9 7	8.0
8	29.87	29.69	29 799	29.5	2:30 P	10.0	3 A	19.7	20.7	17.5	7.8
9	30.15	29.81	30.073	25.0	3 P	11.5	7:30 A	18.3	18.1	12.3	9 0
10	30.44	30.15	30.421	22.0	4 P	−4.5	7:30 A	8 7	7.1	2.0	9.5
11	30.33	29.60	29.827	32.0	10 P	−2.5	3:30 A	14.7	14.7	16.5	0.0
12	30.17	29.65	29 963	27.0	0 A	6.5	12 P	16.7	15.0	10.3	9.3
13	30.39	30.17	30.359	21.5	4 P	−1.0	7:30 A	10.3	10.7	6.5	9 5
14	30.26	29.90	30.160	37.0	4 P	8.0	7 A	22.5	20.8	17.5	9.5
15	30.01	29.95	29.983	43.5	3 P	13.0	7 A	28.3	29 0	24.0	9.0
16	29.95	29.79	29.823	40.0	3:30 P	26 0	7 A	33.0	34.0	30 7	7.0
17	30 02	29.80	29.896	31.0	2 P	18.0	12 P	24.5	25.1	19.3	8.0
18	30.27	30.02	30.209	30 0	3 P	11.0	7 A	20.5	19 7	15 0	9.8
19	30.28	30.11	30.204	36 0	3:30 P	8 0	7 A	22.0	22 4	18 5	9 0
20	30.14	29 99	30.043	49.5	3 P	27.0	7 A	38.3	38 4	35.0	6.8
21	30.19	30.03	30.130	55 0	3 P	33.0	7 A	44 0	41.5	34.7	7.0
22	30.19	29 57	29.813	39.5	11 P	32.0	7 A	35.7	33.4	32.3	0.0
23	29 94	29 56	29.739	37.0	0 A	16 5	12 P	26.7	28.1	23.0	7.2
24	30 04	29.94	30 024	29.0	3 P	12.5	12 P	20 7	18.5	14.0	8.5
25	30.20	30.04	30.155	26.5	3 P	7.5	6:30 A	17.0	16.0	13.0	10.0
26	30.31	30 05	30 221	30.5	3:30 P	6.5	6:30 A	18 5	20 2	17.5	7.3
27	30.05	29.57	29.741	33.0	8 P	24.0	0 A	28.5	28.6	28 5	0.0
28	30.09	29.57	29.859	48.0	4 P	32.5	0 A	40.3	37.5	35.0	6.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	17.0	.131	76.0	W.	445	13.5	52	1 P	10 A	5 P	T	T
2	15.0	.109	82.0	W.	276	2.5	22	1 P				
3	21.5	.146	83.0	S.W.	131	0.5	10	10 A	8 A	8 P	.69	6
4	12.0	.125	65.0	N.W.	182	4.5	30	9 A				
5	10.0	.091	78.5	W.N.W.	246	4.5	30	9 A				
6	0.5	.075	61 5	W.	194	5.5	33	12 M				
7	4.5	.076	74.5	W.	239	2.5	22	8 A				
8	10.0	.112	65.0	W.S.W.	267	7.5	39	10 P	6 P	12 P	T	T
9	5.0	.086	67.0	W.N.W.	365	6 5	36	11 A				
10	−1.5	.052	83.0	N.	85	1.0	14	12 M				
11	14.0	.100	87.5	S.W.	23	4.5	30	7 P	5 A	8 P	.28	2
12	2.0	.081	63.0	W.N.W.	409	12.5	50	2 P				
13	−1.0	.068	66.5	W.S.W.	185	3.0	25	2 P				
14	11.0	.113	70.0	S.	196	1.0	14	2 P				
15	19.0	.152	73.5	S.	84	0.5	10	5 P				
16	28.5	.179	90.0	N.W.	51	0.0	—	—	1 P	12 P	T	T
17	14.5	.115	76 0	N.N.E.	188	1.5	17	5 A	0 A	2 A	T	T
18	6.0	.098	61 5	N.N.W.	304	4.5	30	2 P				
19	11.5	.119	66.0	N.W.	72	0 0	—	—				
20	31.0	.232	79 5	S.S.E.	44	0.0	—	—				
21	30.5	.227	74.5	S.W.	62	0 0	—	—	6 P	12 P	.03	
22	30.0	.189	90.0	N.W.	79	0.0	—	—	0 A	*10 P	.63	
23	18.0	.140	72.5	W.	368	6.5	36	1 P	8 A	3 P	T	T
24	5.0	.095	61.0	W.N.W.	235	1.0	14	6 P				
25	7.5	.088	73 0	W.N.W.	194	1.0	14	8 A				
26	12.5	.108	76.0	S.	103	1.0	14	6 P	7 P	12 P	.13	2
27	26.5	.165	87 0	S.W.	70	0.0	—	—	0 A	12 P	.90	1
28	32.0	.221	83.0	N.W.	97	1.0	14	4 A	0 A	4 A	.28	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during February was generally good winter weather, in marked contrast with the abnormal conditions of the preceding two months. Departures from normals were in most cases not especially marked and of little influence on the weather as a whole. During about half the month the sleighing was fair in this section.

A study of the records of the several weather elements for the month shows the following as the more important features. The mean barometer was slightly lower than the normal and the range unusually small for this time of the year. This was due to both a low maximum and high minimum. Notwithstanding the comparatively quiescent pressure the total wind movement was slightly greater than usual. All the gales were from nearly a westerly direction.

The mean temperature was slightly lower than the normal and the range was the usual amount. The thermometer registered below zero on three dates, all during the first half of the month. The first half of the month was considerably colder than the last half; the records showing that during the first fourteen days the mean daily temperature was above the mean for the month on but three days while the last fourteen days had but five days when the daily mean was below the monthly mean.

The mean dew point and relative humidity were both considerably below the normals for these elements.

The total precipitation was about ten per cent. less than the normal and about two-thirds occurred as rain.

The amount of cloudiness was much below the average for February.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

BULLETIN No. 291. MARCH, 1913

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.56, 18th, 8A.;
Minimum reduced to freezing, 28.96, 27th, 5 P.
Reduced† maximum reading, 30.88, 18th, 8 A.;
Reduced† minimum reading, 29.26, 27th, 5 P.
Mean semi-daily reduced, ... 30.112
Monthly range, ... 1.92

***Air Temperature.** In Degrees Fahr.

Highest, ... 74.0, 25th, 3:30 P.
Lowest, ... 1.0, 8th, 3 A.
Mean hourly, ... 37.9
Mean of means of max. and min., ... 38.3
Mean sensible (wet bulb), ... 34.3
Monthly range, ... 73.0
Highest mean daily, ... 59.4, 25th
Lowest mean daily, ... 9.4, 7th
Mean maximum, ... 47.9
Mean minimum. 28.5
Mean daily range, ... 19.4
Greatest daily range, ... 35.5, 9th
Least daily range, ... 4.0, 1st, 4th

Humidity.

Mean dew point, ... 30.7
Mean force of vapor, ...236
Mean relative humidity, ... 79.3

Precipitation. In inches.

Total precipitation, ... 6.38
Number of days on which .01 inch or more rain fell, ... 17
Total snow in inches 5.0

*Temperature in ground shelter.
Reduced to freezing and sea-level.

Wind.

Total movement, ... 6413m.
Greatest daily movement, ... 443m., 22d
Least daily movement, ... 40m., 1st, 20th
Mean daily movement, ... 207 m
Mean hourly velocity, ... 8.6 m
Maximum pressure per square foot, 23.5 lbs.= 68m. per hour, 31st, 3 P., S.W.
Maximum velocity for 5 minutes, 48 m. per hour, 27th, 9 P., W.
Prevailing Direction, West Southwest.

Summary.

West	20 per cent,
South Southwest	20 " "
South Southeast	13 " "
South	10 " "
West Southwest	10 " "
Northwest	10 " "
Other directions	17 " "

Weather.

Mean cloudiness observed, ... 62 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 189 hrs.=51 per cent.
Number of clear days, ... 10
Number of fair days, ... 8
Number of cloudy days, ... 13

Bright Sunshine.

Number of hours recorded, . . 182 hrs=49%.

Rain. 1st, 9th, 10th, 11th, 13th, 14th, 15th, 16th, 20th, 21st, 23d, 24th, 25th, 26th, 27th, 30th, 31st.

Snow, 2d, 4th, 6th, 11th.

Thunder and Lightning, 1st, 25th, 26th, 27th, 31st.

Days of Sleighing, 3.

Gales, 35 or more miles per hour: 64 m, 20th, W.N.W.; 44m, 6th, W.N.W.; 49m, 7th, W.; 43m. 21st, S.S.W.; 43m., 22d, W.; 36m. 24th, S.; 48m. 27th, W.; 39m. 28th, W.; 68m. 31st, S.W.

Hail, 31st.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. of Hours Bright Sunshine
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.08	29.79	29.946	34.0	8 P	30.0	5 A	32.0	33.7	32.0	0.0
2	30.19	29.72	29.934	37.0	2 P	20.0	12 P	28.5	29.0	23.3	8.3
3	30.32	30.04	30.200	37 0	4 P	15 5	6 A	26.3	27.3	22.5	8.0
4	30.20	29 91	30.094	35.0	2 P	31.0	12 P	33 0	32.6	30.5	0.0
5	29.92	29.85	29.904	44.0	3:30 P	26 0	12 P	35.0	33.3	29.7	9.5
6	29.85	29 46	29.689	36.0	3 P	12.0	12 P	24.0	23 5	21.5	2.0
7	30.38	29 83	30.194	13 5	1 P	6.0	12 P	9.7	9.4	6 7	10.2
8	30.44	30.21	30.370	29.5	3 P	1 0	3 A	15.3	16.2	13 0	9 5
9	30.21	29.91	30.044	59.0	3:30 P	23.5	0 A	41.3	40.4	37 5	8 7
10	30.24	30.04	30.172	49.5	3 P	33.5	6:30 A	41.5	41.0	35.3	8 0
11	30.15	29.87	29.962	45.5	4:30 P	33 0	5 A	39.3	36 9	35.0	7.0
12	30.44	30.15	30.392	53 0	3:30 P	27.0	6:30 A	40 0	38 9	33 3	10.5
13	30 45	30.25	30.369	44 5	4 P	32.5	7 A	38.5	37.4	36 0	0.5
14	30.25	29 73	29.895	57.0	5 P	39.0	0 A	48 0	46.5	47.3	0 0
15	29.75	29.45	29.576	57 0	4 P	48 0	12 P	52.5	53.2	53 3	0.0
16	30.01	29 56	29.776	47 0	2:30 P	28.5	12 P	37.7	39.9	34.5	2.3
17	30.75	30.01	30.527	37 5	12:30 P	22 0	12 P	29 7	28.6	23.3	10.5
18	30.88	30.55	30.732	46.5	3 P	17.0	6:30 A	31.7	31.8	27.5	10.5
19	30.55	30.31	30.431	64 0	3 P	34.0	3 A	49.0	47 4	41.7	11 0
20	30.35	29 95	30 078	52 0	6 P	33 5	6 A	42 7	43.5	42.7	0.0
21	30.08	30.07	29 938	65 0	3 P	47.0	0 A	56 0	55.5	55.3	1.2
22	30.63	29.90	30.405	41.5	2 P	28.5	12 P	35 0	37.9	28.7	11.0
23	30.80	30 43	30 672	47 0	2:30 P	22 0	6 A	34.5	35 0	30.7	9 5
24	30.43	29 98	30 073	69.5	2:30 P	37.0	0 A	53.3	55.0	51.7	7.3
25	30.04	29 78	29.945	74.0	3:30 P	50.0	12 P	62.0	59.4	56 5	8.5
26	30 11	29.93	30 042	50 0	0 A	36 5	6 A	43 3	39 4	37.3	0.0
27	29 93	29 26	29.594	60 5	2 P	30 0	12 P	45 3	42.9	33.7	0 0
28	30.39	29 67	30.257	39.0	4 P	27 0	6 A	33 0	31.2	26.7	11 5
29	30.55	30.37	30.484	48.0	4 P	22 0	6:30 A	35.0	34 1	29.3	11 0
30	30 37	29.98	30.189	56.0	3 P	32.0	3 A	44.0	44 6	42.0	5 0
31	29 98	29 35	29 592	58.0	2:30 P	40.5	12 P	49.3	48 1	46.3	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	30 0	.188	90.0	N.N.E.	40	0.0	—	—	10 A	9 P	.17	
2	17.0	.141	70.0	N.W.	253	20.5	64	2 P	3 P	4 P	T	T
3	16.0	.145	66.5	W.	360	5.5	33	1 A				
4	27.5	.180	85.0	W.N.W.	76	0.0	—	—	6 P	11 P	.06	1
5	26.5	.175	82.0	N.N.E.	41	0.0	—	—				
6	17 0	.127	77.0	N.W.	122	9.5	44	1:30 P	8 A	4 P	.41	4
7	−1.0	.066	63.0	W.	414	12.0	49	8 A				
8	7.0	.094	72.5	S.	154	1.0	14	10 P				
9	35.0	.249	86.5	S.	283	4.5	30	4 P	6 P	10 P	T	
10	29.0	.234	70.5	W.S.W.	129	2.0	20	4 A	11 P	12 P	.06	
11	33.0	.211	91.5	N.E.	74	0.0	—	—	0 A	11 A	.38	T
12	29.0	.213	76.0	W.S.W.	60	0.0	—	—				
13	34 0	.222	91.5	S.S.E.	48	1.0	14	2 P	11 A	1 P	T	
14	47.0	.339	96.0	S.S.E.	64	1 0	14	4 A	1 A	3 P	.89	
15	53.0	.412	98.5	S.S.W.	269	3 0	24	3 P	12 M	12 P	.20	
16	31.0	.219	80.0	N.W.	136	4.5	30	10 P	0 A	7 P	.11	
17	15.0	.144	62.5	W.	354	4 5	30	1 P				
18	21 5	.175	69.5	S S.W.	264	5 0	32	12 M				
19	36.0	.315	67.5	S.S.W.	347	4.0	28	2 P				
20	42.0	.288	94.5	S.S.W.	40	0 0	—	—	6 A	7 P	.62	
21	54.5	.455	94.5	S.S W.	197	9.0	43	5 P	3 P	8 P	.02	
22	18.0	.194	52.5	W.	443	9.0	43	8 A				
23	26.0	.194	73.0	S.S.E.	190	2 5	22	6 P	11 P	12 P	.06	
24	49 0	.432	80.5	S.S E.	374	6.5	36	10 A	0 A	5 A	.28	
25	56.0	.487	90.0	S.S.W.	365	5.0	32	3 P	6 P	12 P	.26	
26	35.5	.233	89.5	N.N.W.	92	2.0	20	11 A	0 A	12 P	1.04	
27	30.5	.208	82.0	W.	218	11.5	48	8 P	0 A	6 P	1.14	
28	20.5	.163	70.5	W.	416	7.5	39	6 A				
29	22 0	.186	65.5	W.S.W.	123	2.5	22	7 P				
30	49.5	.296	84.5	S.	242	2 0	20	3 P	4 P	12 P	.04	
31	44.0	.345	86.0	S.W.	225	23 5	68	3 P	0 A	8 P	.64	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

With the close of the winter season a comparison of the temperature record with that of former winters can safely be made. Taking the season as a whole from the 1st of December to the close of this month it can safely be said that it was the mildest winter within the memory of the "oldest inhabitant." Using the temperature records of this town, which extend back to 1837, no previous year shows such a high mean temperature for the four months. The winter of 1879–80, however, was almost as mild. The months of December, January and March were all a few degrees colder than the corresponding months of the past season. February, however, of that year was more than seven degrees warmer than the same month this year. The maximum and minimum temperatures of that winter were both several degrees lower than those records of the season just closed. February stands out as the only month of the winter when the temperature conditions were nearly normal.

March started out with a thunderstorm on the 1st, and snow on the 4th and 6th. The latter snowstorm furnished sleighing for only a few days as the temperature rose to 59 degrees on the 9th. Before the middle of the month the frost was practically all out of the ground and the rains about that time settled the roads so that they were fairly passable. The equinoctial storms were comparatively light and the transition to spring was practically completed by them.

The last week of the month was unusually stormy with a number of heavy rains and severe thunder and lightning on several days and on the 31st there was a severe hailstorm with thunder and lightning and the heaviest wind of the month. The total precipitation was two and one-half inches above normal.

The month closed with the season fully two weeks in advance of the usual conditions at the end of March.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

BULLETIN No. 292. APRIL, 1913

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.25, 10th, 7A.
Minimum reduced to freezing,	29.19, 1st, 0 A.
Reduced† maximum reading,	30.56, 10th, 7 A.;
Reduced† minimum reading,	29.50, 1st, 0 A.
Mean semi-daily reduced,	30.020
Monthly range,	1.06

***Air Temperature.** In Degrees Fahr.

Highest,	84.5, 25th, 2:30 P.
Lowest,	22.5, 8th, 6 A.
Mean hourly,	47.6
Mean of means of max. and min.,	48.0
Mean sensible (wet bulb),	42 9
Monthly range,	62.0
Highest mean daily,	65.9, 25th
Lowest mean daily,	34.2, 9th
Mean maximum,	58.3
Mean minimum,	37.6
Mean daily range,	20.7
Greatest daily range,	38.0, 22d
Least daily range,	6.5, 13th

Humidity.

Mean dew point,	38.5
Mean force of vapor,	.338
Mean relative humidity,	74.4

Precipitation. In inches.

Total precipitation,	3.30
Number of days on which .01 inch or more rain fell,	14
Total snow in inches	trace

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

Wind.

Total movement,	5659m.
Greatest daily movement,	542m., 2d
Least daily movement,	32m., 12th
Mean daily movement,	189 m
Mean hourly velocity,	7.9 m

Maximum pressure per square foot, 16.5 lbs.= 58m. per hour, 1st, 8 P., W.N.W.
Maximum velocity for 5 minutes, 30 m. per hour, 1st, 9 P., W.N.W.
Prevailing Direction, West Northwest.

Summary.

West	13 per cent.
South Southwest	13 " "
North Northwest	10 " "
Northwest	10 " "
Northeast	10 " "
Other directions	44 " "

Weather.

Mean cloudiness observed,	55 per cent
Total cloudiness recorded by the Sun Thermometer,	191 hrs.=48 per cent.
Number of clear days,	8
Number of fair days,	12
Number of cloudy days,	10

Bright Sunshine.

Number of hours recorded, 211 hrs=52%.

Rain, 3d, 4th, 5th, 6th, 7th, 9th, 11th, 12th, 13th, 16th, 19th, 23d, 25th, 28th, 29th.

Snow, 6th, 7th, 9th.

Frosts, 7th, 10th, 22d.

Thunder and Lightning, none.

Gales, 35 or more miles per hour: 58 m, 1st, W.N.W.; 40m, 2d, W.S.W.; 38m., 19th, W.; 39m., 30th, N.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. of Hours Bright Sunshine.
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.70	29.50	29.610	46.0	2:30 P	34.5	7 A	40.3	37.8	31.3	4.0
2	30.14	29.70	29.969	50.0	12 M	36.0	1 A	43.0	41.5	33.7	11.0
3	30.23	30.08	30.162	55.5	5 P	34.5	2 A	45.0	43.0	38.7	6.0
4	30.14	29.97	30.070	54.0	3 P	38.0	7 A	46 0	43.9	39.7	3.3
5	30.00	29.89	29.979	52.5	2:30 P	34.5	12 P	43.5	42.9	37.3	7.3
6	29.99	29.81	29.922	43.5	1 P	27.0	5:30 A	35.3	34 6	31.0	4.0
7	30.18	29.88	30.081	42.0	1 P	28.0	12 P	35.0	35.6	32.0	5.5
8	30.22	30.04	30.164	47.5	4 P	22.5	6 A	35.0	35.8	32.0	11.0
9	30.49	30.12	30.409	44.5	5 P	26.0	6 A	35.3	34.2	29.0	11.3
10	30.56	30.39	30.477	53.0	4 P	23.0	6 A	38.0	38.7	35.7	10.0
11	30.39	30.10	30.248	43.5	8 P	36 0	6 A	39.7	39.1	39.3	0.0
12	30.10	29.94	29.905	62.5	3 P	42.0	0 A	52.3	53.0	51.5	2.8
13	29.97	29.75	29.834	52.5	1:30 P	46.0	8 A	49.3	48.8	47.0	0.2
14	29.94	29.74	29.853	57.0	2 P	43.0	3 A	50.0	51.0	48.5	2.3
15	30.00	29.81	29.949	62 0	2 P	40.0	0 A	54.0	52.1	46.0	8.2
16	29.81	29.62	29.678	54.0	3 P	43.0	11 P	48.5	47.8	42.3	0.0
17	30.05	29.71	29.935	62.5	3:30 P	39.0	12 P	50.7	49.5	41.5	12.0
18	30.14	29.85	30 033	64.0	3 P	30.0	6 A	47.0	48.3	45.5	10.0
19	29.95	29.65	29 838	62.5	11 A	35.0	12 P	48.7	48.1	42.5	7.0
20	30.23	29.93	30.074	41.0	2 P	30.5	8 A	35.7	35.2	30.0	9.5
21	30 41	30.23	30.332	57.5	3 P	28.5	4:30 A	43.0	44.0	37.3	11.8
22	30.27	30.04	30.163	70.0	3 P	32.0	6 A	51.0	53.0	48.5	9.0
23	30.17	30.01	30.090	75.0	3 P	50.0	7 A	62.5	60.2	53.5	6.7
24	30.21	30.08	30.177	82.0	4 P	44.5	6 A	63.3	63.3	57.0	11.0
25	30.16	30 03	30.137	84.5	2:30 P	52 0	6 A	68.3	65.9	60.0	8.8
26	30.15	30.04	30.089	76.0	2 P	48.5	6 A	62.3	61.5	55.3	11.8
27	30.04	29.85	29.913	72.5	1:30 P	45.0	5:30 A	58.7	60.3	56.0	10.2
28	29.85	29.66	29.723	59.5	2:30 P	49.0	12 P	54.3	55.1	52.0	1.0
29	30.01	29.68	29.772	63.0	2:30 P	46.0	5 A	54.5	53.7	51.7	3.0
30	30.05	29.90	30.021	59.0	4:30 P	38.0	5 A	48.5	49.0	41.7	12.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	22.5	.212	58.0	W.	458	16.5	58	8 P				
2	22.0	.248	50.0	W.S.W.	542	8.0	40	11 A				
3	34.5	.275	72.5	E.S.E.	60	0.0	—	—	9 P	12 P	.01	
4	37.5	.266	84.5	N.N.E.	115	0.0	—	—	0 A	7 A	.c5	
5	32.5	.248	76.0	N.W.	147	2.5	22	5 P	0 A	8 A	.43	
6	31.5	.244	78.0	W.	70	1.0	14	9 P	8 A	3 P	.03	T
7	26.0	.208	68.5	N.W.	251	4.5	30	12 M	2 P	4 P	T	T
8	25.5	.210	67.0	W.N.W.	168	5.5	33	11 P				
9	22.5	.181	67.5	N.W.	297	5.0	32	10 A	1 A	3 A	.01	T
10	30.5	.239	73.5	N.N.W.	49	0.0	—	—				
11	38.5	.247	96.0	S.S.E.	150	0.5	10	2 P	3 A	12 P	1.r2	
12	50.0	.418	85.5	S.S.W.	32	0 0	—	—	0 A	9 A	.66	
13	46.5	.329	96.5	N.	152	0.0	—	—	3 A	11 P	.38	
14	46.5	.378	85.5	N.N.E.	103	0.0	—	—				
15	42.0	.359	75.5	N.E.	187	2.0	20	9 A				
16	36.5	.320	68.5	N.E.	131	1.0	14	2 A	8 A	9 A	.03	
17	34.5	.324	62.0	N.N.W.	271	3.5	26	4 A				
18	43.5	.330	89.0	W.S.W.	244	5.0	32	2 P				
19	38.5	.312	77.0	W.S.W.	346	7.0	38	4 P	1 A	3 A	.06	
20	23.5	.191	69.5	W.	415	5.5	33	3 P				
21	27.0	.292	50.5	W.	179	3.0	24	10 A				
22	43.0	.419	70.0	S.	103	0.0	—	—				
23	49.0	.509	71.5	S·W.	86	0.0	—	—	7 A	9 A	.04	
24	54.5	.550	77.5	W.S.W.	44	0.0	—	—				
25	57.5	.605	79.5	S.E.	59	0.0	—	—	3 P	3:30 P	.03	
26	51.0	.523	72.5	S.	165	1.0	14	3 P				
27	53 0	.507	79.5	E.S.E.	156	1.5	17	5 P				
28	49.5	.430	83.0	E.	135	0.0	—	—	3 A	12 M	.29	
29	50.0	.417	86.0	N.E.	161	4.5	30	3 P	8 A	8 P	.16	
30	34.5	.334	60.0	N.N.W.	383	7.5	39	10 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during April proved disappointing to those who had expected an early season. Much of the seasonal progress shown at the beginning of the month was lost before the month closed. While no particular weather element seemed especially abnormal, the advance of spring was arrested and conditions were nearly normal at the end of the month.

The first half of the month was much more rainy than the last half, although precipitation was well distributed throughout the month.

The record of the several weather elements shows the following as the more important features: The mean barometer was higher than the normal and the range a little less than the usual amount. The maximum and minimum pressures were both higher than the average value of these records. The minimum record was made as the month opened, and was followed by a wind record of a thousand miles on the first two days of the month. The total wind movement was slightly greater than the normal and the daily prevailing direction more variable than usual.

The mean temperature was about two degrees above the normal, and the maximum and minimum records both high. Only a few frosts were noted, and no damage was done by them. From the 21st to the 29th, inclusive, was the warmest period of the month.

The mean dew point was practically normal, while the relative humidity was considerably higher than usual.

The total precipitation was about ten per cent more than the normal, and two-thirds of the total fell from the 11th to the 13th, inclusive. While many showers occurred no thunder storms were noted.

The percentage of cloudiness observed was slightly more than the normal.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

BULLETIN No. 293. MAY, 1913

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30 10, 4th, 12P.
Minimum reduced to freezing,	29.23, 29th, 2P.
Reduced† maximum reading,	30.39, 4th, 12 P.
Reduced† minimum reading,	29.52, 29th, 2 P.
Mean semi-daily reduced,	29.995
Monthly range,	0.87

***Air Temperature.** In Degrees Fahr.

Highest,	89.0, 3d, 4 P.
Lowest,	30.5, 11th, 2:30 A.
Mean hourly,	55.6
Mean of means of max. and min.,	55.5
Mean sensible (wet bulb),	50 4
Monthly range,	58.5
Highest mean daily,	73.2, 3d
Lowest mean daily,	41.3, 10th
Mean maximum,	66.6
Mean minimum,	44.3
Mean daily range,	22.3
Greatest daily range,	43.5, 2d
Least daily range,	4.5, 28th

Humidity.

Mean dew point,	46.0
Mean force of vapor,	.445
Mean relative humidity,	73.0

Precipitation. In inches.

Total precipitation,	4.94
Number of days on which .01 inch or more rain fell,	13

*Temperature in ground shelter.

†Reduced to freezing and sea-level.

Wind.

Total movement,	3672m.
Greatest daily movement,	289m., 19th
Least daily movement,	14m., 22d
Mean daily movement,	118 m
Mean hourly velocity,	4.9 m
Maximum pressure per square foot, 5.5 lbs.= 33m. per hour, 29th, 1 P., N.W.	
Maximum velocity for 5 minutes, 30 m. per hour, 29th, 5P., N.W.	
Prevailing Direction, Northwest.	

Summary.

North Northwest	19 per cent.
Northwest	16 " "
West Northwest	13 " "
South Southeast	13 " "
Other directions	39 " "

Weather.

Mean cloudiness observed,	53 per cent.
Total cloudiness recorded by the Sun Thermometer, 232 hrs.=51 per cent.	
Number of clear days,	6
Number of fair days,	14
Number of cloudy days,	11

Bright Sunshine.

Number of hours recorded, 221 hrs=49%.

Rain, 6th, 9th, 13th, 15th, 16th, 18th, 21st, 22d, 23d, 24th, 25th, 27th, 28th, 29th.

Frosts, 11th, 12th, 15th.

Thunder and Lightning, 6th, 13th.

Gales, 35 or more miles per hour: None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. of Hours Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.07	29.92	30.006	73.5	4:30 P	33.0	6 A	53.3	55.6	51.3	10.5
2	29.99	29.84	29.952	87.5	3 P	44.0	5 A	65.7	68.1	59.5	11.2
3	30.13	29.93	30.031	89.0	4 P	53.0	4:30 A	71.0	73.2	60.3	11.5
4	30.39	30.13	30.386	75.5	4 P	54.0	6 A	64.7	62.8	56.5	7.5
5	30.39	30.11	30.245	76.5	2:30 P	56.0	6 A	66.3	63.7	57.5	7.5
6	30.11	29.84	29.959	87.0	4 P	52.0	5:30 A	69.5	67.5	60 0	10.5
7	30.13	29.87	29.998	71.0	2 P	49.5	12 P	60.3	61 9	53.5	10.5
8	30.29	30.13	30.246	68.0	5 P	38.0	6 A	53.0	53.5	49.5	12.0
9	30.23	29.99	30.076	62.5	4 P	46.5	3 A	54.5	52.0	45.5	3.8
10	30.06	29.98	30.052	49.0	3:30 P	32.0	12 P	40.5	41.3	34.3	6.0
11	30.02	29.88	29.954	56.5	3 P	30.5	2:30 A	43.5	43.9	38.7	9.3
12	30.02	29.88	29.966	65.0	6 P	31.0	6 A	48.0	49.8	46.3	11.8
13	29.95	29.76	29 879	68.0	3 P	42.5	5:30 A	55.3	53.9	47.7	4.0
14	30.17	29.87	29.997	69 0	5 P	45.5	12 P	57.3	57.3	52.3	12.0
15	30.27	30.07	30.181	61.0	2 P	34.0	6 A	47.5	49.7	44.0	7.0
16	30.07	29.88	29.939	51.0	0 A	43.0	12 P	47.0	46.5	44.5	0.0
17	30.17	30.05	30.125	56 5	4 P	42 0	1 A	49.3	48.5	46.0	2.9
18	30.13	29.87	29.946	60.5	5:30 P	46.0	4 A	53.3	51.8	45 5	2.7
19	30.07	29.87	29.962	60.0	1 P	43.5	12 P	51.7	53.0	46.5	9.0
20	30.18	30.04	30.121	67.0	5 P	37.0	5 A	52.0	53.6	49.0	11.5
21	30.23	30.10	30.180	65.0	3 P	37.0	5 A	51.0	53.1	50.5	5.0
22	30.10	29 83	29.919	57.0	6 P	49 0	5 A	53.0	53.0	52.3	0.0
23	29.89	29.79	29 849	63.5	3 P	54.0	0 A	58.7	57.4	56.7	0.0
24	29.84	29.77	29.823	64.5	12:30 P	55.0	3 A	59.7	57.7	55.0	1.7
25	30.00	29.83	29.899	70.0	3 P	50.0	5 A	60.0	60.0	53.7	12.0
26	30.10	30.00	30.072	70.0	5 P	41.0	5 A	55.5	55.7	48.3	11.3
27	30.17	30.09	30.142	55.5	11 A	45.5	5:30 A	50.5	51.0	49.3	0.0
28	30.09	29.68	29.855	53.5	11:30 A	49.0	3 A	51.3	51.0	48.7	0.0
29	29.68	29.52	29.587	62.0	2:30 P	49.0	5 A	55.5	55.6	52.3	6.8
30	29.75	29.61	29.668	73.5	5 P	46.0	5 A	59.7	59.4	52.3	12.0
31	29.94	29.75	29.826	76.5	4:30 P	44.0	6 A	60.3	61.5	56.0	10.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	46.0	.475	67.0	N.N.W.	102	1.5	17	11 A				
2	56.0	.654	70.5	W.N.W.	79	2.5	22	2 P				
3	54.0	.749	56.5	W.N.W.	61	1.0	14	11 A				
4	54.5	.505	84.5	S.W.	93	0.0	—	—				
5	54.5	.551	78.5	S.	136	0.0	—	—				
6	57.5	.590	80.5	S.	43	3.5	26	6 P	7 P	11 P	.12	
7	48.0	.509	67.0	N.N.E.	226	2.0	20	8 A				
8	44.0	.433	67.5	N.N.W.	111	2.0	20	6 P				
9	39.5	.358	71.0	W.	280	4.5	30	3 P	7 A	9 A	.02	
10	27.5	.231	66.0	N.N.W.	253	4.0	28	5 P				
11	29.5	.304	54.0	N.W.	247	3.5	26	7 A				
12	38.0	.407	57.0	N.W.	76	0.5	10	1 P				
13	42.0	.402	67.0	S.S.E.	170	3.0	24	5 P	12 M	7 P	.04	
14	47.0	.483	66.5	N.W.	179	2.0	20	4 P				
15	37.0	.361	61.0	E.	99	0.0	—	—	10 P	12 P	.04	
16	43.5	.310	90.5	E.	54	0.0	—	—	0 A	11 A	.36	
17	44.0	.347	83.0	S.S.E.	64	0 0	—	—				
18	41 0	.369	68.0	S.S.E.	34	0.0	—	—	12 M	4 P	T	
19	39.5	.400	61.0	W.	289	5.0	32	11 A				
20	42.0	.447	59.5	W.N.W.	150	3.0	24	4 P				
21	48.0	.397	86.5	S.W.	43	0.0	—	—	3 P	12 P	.10	
22	52.0	.399	97.0	S.S.E.	24	0.0	—	—	0 A	12 P	.42	
23	56.5	.468	97.0	E.S.E.	14	0.0	—	—	0 A	12 P	1.45	
24	54.5	.450	94.0	N.N.E.	49	0.0	—	4 P	0 A	12 P	.85	
25	49.0	.512	68.0	N.W.	166	3.5	26	—	0 A	2 A	.02	
26	41.5	.432	62.0	N.N.W.	81	0.0	—	—				
27	48.0	.370	90.5	N.N.W.	31	.05	10	8 A	11 A	6 P	.17	
28	47.0	.366	88.5	N.	73	0.0	—	—	11 A	12 P	1.34	
29	48.0	.463	74.0	N.W.	216	5.5	33	1 P	11:30A	12:30P	.01	
30	47.0	.501	64.0	W.N.W.	198	0.5	10	8 A				
31	51.0	.564	66.5	N.N.W.	91	0.5	10	1 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during May was normal in most of its features, although variations were quite pronounced at different periods of the month. The first week was the warmest part of the month, while from the 8th to the 23d the temperature was considerably below the mean for the month. Killing frosts were noted on the mornings of the 11th and 12th, and a rather heavy frost on the morning of the 15th. The amount of damage done was considerable, but varied greatly in sections close to one another. The last decade of the month was marked by two very heavy rain storms, which made nearly the whole of the precipitation record.

The mean barometer was considerably higher than the normal for May; the maximum and minimum records, as well as the range of pressure, showed practicaliy no departure from normal values.

The total wind movement was about 80 per cent of the average amount for May, and no gales were noted. The amount of wind from the Northwest quadrant was about one-half the total.

The mean temperature was about one and one-half degrees below the normal, and the range slightly greater than usual. The maximum record was about two degrees higher than the usual value, and occurred so early in the month that it was more noticeable than it otherwise would have been. The minimum record was more than a week later than the maximum, and was preceded by the coldest day of the month. The low relative humidity which prevailed during the lowest temperatures of the month tended to minimize the damage from freezing.

The mean dew point was rather low, and the relative humidity for the month considerably higher than the normal.

The total precipitation was about one-third more than the normal, and but little of it occurred prior to the heavy rains noted above. Only two light thunder storms were noted.

The amount of sunshine was practically normal. The month closed with the growing season somewhat behind the normal conditions for the last of May.

J. E. OSTRANDER, Meteorologist.

H. W. ANGIER, Observer.

BULLETIN No. 294. JUNE, 1913

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30 14, 15th, 9 A.
Minimum reduced to freezing,	29.34, 2d, 3 A.
Reduced† maximum reading,	30.43, 10th, 9 A.
Reduced† minimum reading,	29.63, 2d, 3 A.
Mean semi-daily reduced,	29.996
Monthly range,	0.80

***Air Temperature.** In Degrees Fahr.

Highest,	92.0, 16th, 3:30 P.
Lowest,	37.0, 10th, 5 A.
Mean hourly,	66.4
Mean of means of max. and min.,	66.0
Mean sensible (wet bulb),	59 4
Monthly range,	55.0
Highest mean daily,	77.2, 16th
Lowest mean daily,	52.3, 9th
Mean maximum,	80.0
Mean minimum,	51.9
Mean daily range,	28.1
Greatest daily range,	37.5, 29th
Least daily range,	12.5, 20th

Humidity.

Mean dew point,	54.6
Mean force of vapor,	.644
Mean relative humidity,	68.4

Precipitation. In inches.

Total precipitation,	.90
Number of days on which .01 inch or more rain fell,	6

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	3746m.
Greatest daily movement,	227m., 6th
Least daily movement,	41m., 21st
Mean daily movement,	125 m
Mean hourly velocity,	5.2 m

Maximum pressure per square foot, 4.5 lbs.= 30m. per hour, 3d, 11 A., S.S.W.

Maximum velocity for 5 minutes, 24 m. per hour, 3d, 1 P., S.S.W.

Prevailing Direction, West Northwest.

Summary.

North Northwest	20 per cent.
Northwest	10 " "
West	13 " "
West Southwest	10 " "
South	13 " "
Other directions	34 " "

Weather.

Mean cloudiness observed, ... 35 per cent.

Total cloudiness recorded by the Sun Thermometer, ... 145 hrs.=32 per cent.

Number of clear days,	9
Number of fair days,	19
Number of cloudy days,	2

Bright Sunshine.

Number of hours recorded, . . 312 hrs=68%.

Rain, 2d, 4th, 7th, 16th, 19th, 20th, 21st.

Thunder and Lightning, 7th.

Gales, 35 or more miles per hour: None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. of Hours Bright Sunshine.
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.98	29 68	29.849	81.5	3 P	44.5	5 A	63 0	65.3	58.5	11.3
2	30.01	29.63	29.879	76.0	5:30 P	52.0	12 P	64.0	65.5	57 0	11.3
3	30.01	29.79	29.889	78.0	3 P	43.5	5:30 A	60.7	63.2	56.3	11.2
4	30.04	29 80	29.932	80.0	3 P	56.5	12 P	68.3	66 6	60.3	7.8
5	30.22	30.04	30.173	79 0	4 P	48.0	5 A	63.5	64.7	59.5	12.3
6	30.21	29.86	30.086	77.0	1:30 P	53.0	5 A	65.0	64 9	58.5	9.7
7	30.05	29.72	29 826	85.0	1 P	53.5	12 P	69.3	67.0	61.0	6.1
8	30.21	30.05	30.129	65.0	3 P	48.0	5 A	56.5	55.8	49.3	9.9
9	30.35	30.21	30 285	61.5	1 P	41.5	5 A	51.5	52.3	46.0	10.4
10	30.43	30.24	30.343	72.5	4 P	37.0	5 A	54.7	57.1	53.3	12.7
11	30.24	29.93	30.083	79.0	3 P	44.0	4:30 A	61.5	65.5	55.7	13.0
12	30.09	29.93	30 013	82.0	1 P	48 5	5:30 A	65.2	63.8	55.7	12.1
13	30.08	29 80	29 945	81.0	4 P	46.0	5:30 A	63 5	63.0	56.7	11.6
14	29.99	29 80	29.845	87.0	2:30 P	55 5	5:30 A	71.2	70.2	61.5	12.6
15	30 10	29.94	30.035	83 0	2:30 P	49.0	5 A	66 0	67.2	59.7	12.0
16	29.94	29.75	29 800	92.0	3:30 P	62.5	4 A	77.3	77.2	68.3	12.5
17	30.05	29 76	29.952	83 5	3 P	58 0	12 P	70.7	72.3	62.7	10.0
18	30.24	30.05	30 207	78.0	4:30 P	45.5	5 A	61.7	62.9	55.5	13.0
19	30.22	30.04	30.154	74 5	1:30 P	46.5	5 A	60.5	59.8	54.7	7.5
20	30.04	29.74	29 879	67.5	6 P	55.0	0 A	61.3	62.7	61.5	0.3
21	29 80	29.72	29.773	84.0	4:30 P	65 0	3 A	74.5	72.5	65.5	9.0
22	30.01	29.80	29.924	81.5	4 P	59.0	5:30 A	70.3	70.3	60.7	12 5
23	30.06	29.96	30.022	84.0	4 P	51.0	5 A	67.5	69.1	61.3	13.0
24	30.01	29.90	29 943	85 5	3 P	56 5	5:30 A	71.0	71.8	64.0	12.0
25	30.15	29.95	30.090	73.5	9 A	59 5	5 A	66 5	66.0	62.3	9.2
26	30.18	30 04	30.124	74.5	4 P	56.0	5 A	65 3	63.3	60.5	5.0
27	30.04	29.78	29 866	91.0	3 P	64 0	0 A	77.5	76.0	71.7	8.7
28	29.95	29.77	29.887	87.0	4-30 P	61.0	12 P	74.0	75.0	59.2	11.0
29	30.03	29.95	30.007	86.0	3 P	48.5	5 A	67.3	70.0	58.5	12.0
30	30.06	29.84	29.955	90 5	3 30 P	49.5	5-30 A	70.0	71.0	66.7	12.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	53.0	.626	66.0	W.	191	4 0	28	6 P				
2	52.0	.600	64.0	W.	224	3.5	26	8 A	1 A	3 A	.c3	
3	50 5	.580	64.5	W.S.W.	199	4.5	30	11 A				
4	57.5	.621	75.0	E.S.E.	98	0.0	—	—	1 A	4 A	.08	
5	55.5	.628	70 0	N.N.W.	70	0.0	—	—				
6	55.0	.586	75.5	S.	227	3.0	24	2 P				
7	58.5	.634	76.5	N.N.W.	170	2.5	22	7 P	2 P	4 P	.24	
8	43.0	.440	64.0	N.	181	0.0	—	—				
9	38.0	.408	57.0	N.N.W.	171	1.5	17	9 A				
10	49.5	.495	71.0	N.N.W.	69	0 0	—	—				
11	48.0	.631	52.5	W.	141	1.0	14	4 P				
12	51.0	.569	66.0	E.	94	4.0	28	2 P				
13	52.0	.558	71.0	S.S.E.	110	1.5	17	3 P				
14	57.0	.694	67.5	W.N.W.	98	0.0	—	—				
15	54.5	.652	66.0	W.S.W.	130	0.5	10	5 P				
16	64.5	.877	70.5	W.	208	.05	10	4 P	11 P		T	
17	56.5	.785	59.5	N.W.	167	2.5	22	9 P				
18	50.0	.575	62.0	N.W.	105	0.5	10	9 A				
19	51.0	.505	75.0	W.S.W.	85	0.0	—	—	2:30 P	12 P	.47	
20	60.5	.587	89.5	S.	48	0.0	—	—	9 A	12 P	.06	
21	62.5	.756	76.0	N.E.	41	0.0	—	—	0 A	8 A	.02	
22	55 0	.722	60.0	N.W.	94	0.0	—	—				
23	56.0	.719	63.0	N.N.W.	46	0.0	—	—				
24	60.5	.738	72.0	S.	100	0.0	—	—				
25	59.5	.678	77.0	E.S.E.	113	0 0	—	—				
26	59.0	.564	90.5	S.	78	0 0	—	—				
27	70.5	.889	83.5	S.W.	136	0.0	—	—				
28	50.5	.757	50.0	N.N.W.	182	3 5	26	7 A				
29	49.5	.742	48.5	N.	56	0.0	—	—				
30	57.5	.920	67.0	S.S.E.	114	1.0	14	7 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month resembled that of June, last year, in many respects. An unusually small precipitation, low relative humidity and large amount of sunshine, were all much the same as a year ago. The last third of the month was practically without rain. The last half of the month was considerably warmer than the first half.

A comparison of the records for the month of the several weather elements with the normal values shows the following as the more important features: The mean barometer was high for the time of year and the range more than the average value. Fluctuations in pressure were generally small and unimportant. While the total wind movement was slightly greater than the normal no gales were noted and no especially large daily wind movement recorded. Much of the wind was from the northwest quadrant.

The mean temperature was slightly greater than the normal while the maximum record was about the average value for this feature. The maximum was about two degrees below the normal giving a slightly greater range than usual. On the 10th the minimum record of 37 degrees was very close to the frost line but no frost was noted at the station.

The mean dew point and relative humidity were both rather low, owing to the dry conditions prevailing.

The total precipitation was practically one-fourth the normal and more than one-half of it occurred on a single date. Only one thunder shower was noted. Vegetation was much in need of rain at the close of the month. The amount of sunshine was much greater than the normal and but two cloudy days were noted.

J. E. OSTRANDER, Meteorologist.

E. K. DEXTER, Observer.

BULLETIN No. 295. JULY, 1913

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29 90, 31st, 12 P.
Minimum reduced to freezing.	29.26, 6th, 2 P.
Reduced† maximum reading,	30.19, 31st, 12 P.
Reduced† minimum reading,	29.54, 6th, 2 P.
Mean semi-daily reduced,	29.941
Monthly range,	0.65

***Air Temperature.** In Degrees Fahr.

Highest,	100.0, 1st, 3 P.
Lowest,	41.0, 12th, 5:30 A.
Mean hourly,	71.4
Mean of means of max. and min.,	71.6
Mean sensible (wet bulb),	63.5
Monthly range,	59.0
Highest mean daily,	81.8, 1st
Lowest mean daily,	61.8, 7th
Mean maximum,	85.4
Mean minimum,	57.7
Mean daily range,	27.7
Greatest daily range,	45.0, 12th
Least daily range,	10.5, 24th

Humidity.

Mean dew point,	59.8
Mean force of vapor,	.754
Mean relative humidity,	70.5

Precipitation. In inches.

Total precipitation,	1.59
Number of days on which .01 inch or more rain fell,	9

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	4315m.
Greatest daily movement,	324m., 10th
Least daily movement,	46m., 20th
Mean daily movement,	139 m
Mean hourly velocity,	5.8 m

Maximum pressure per square foot, 2.7 lbs.= 73m. per hour, 23d, 5 P., S.S.W.

Maximum velocity for 5 minutes, 27m. per hour, 23d, 4P., S.S.W.

Prevailing Direction, Southwest.

Summary.

South	29 per cent.
Northwest	13 " "
North Northwest	10 " "
South Southwest	10 " "
South Southeast	10 " "
Other directions	28 " "

Weather.

Mean cloudiness observed,	39 per cent.
Total cloudiness recorded by the Sun Thermometer,	138 hrs.=30 per cent.
Number of clear days,	11
Number of fair days,	17
Number of cloudy days,	3

Bright Sunshine.

Number of hours recorded, 324 hrs=70%.

Rain, 2d, 8th, 10th, 12th, 13th, 18th, 20th, 21st, 23d, 24th, 28th, 29th.

Thunder and Lightning, 8th, 13th, 18th, 21st, 23d, 28th, 29th, 30th.

Gales, 35 or more miles per hour: 73m, 23d, S.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum.	Minimum.	Mean, Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.88	29 71	29 789	100.0	3 P	64.5	5 A	82 3	81.8	73.2	12.2
2	30.02	29.79	29.910	88.5	2:30 P	70.5	5 A	79.5	76.4	69.2	6.2
3	30.18	30.02	30.133	91.0	4:30 P	59.0	5 A	75.0	75.1	68.7	12.7
4	30.18	29 98	30.075	95.0	3 P	61.5	4:30 A	78.3	78 0	69 5	12.7
5	30.01	29.73	29.865	95 0	2 P	65.5	5 A	80.3	79.8	71.7	9.5
6	29.73	29.54	29.648	91.5	1 P	64 5	12 P	78.0	78 0	67.3	11.0
7	29.86	29.64	29 775	70.0	3:30 P	54.5	5 A	62.3	61.8	54.7	8.2
8	30.04	29.86	29.988	82.0	2:30 P	45.5	5:30 A	63.7	63.7	56.5	12.5
9	30.04	29.80	29 969	82.0	12 M	48.0	5 A	65.0	67 5	47.3	11.7
10	29.87	29.71	29.786	79.0	2:30 P	63 0	12 P	71.0	70.6	62.0	11.2
11	29.97	29.86	29.923	81.0	3:30 P	51.5	5:30 A	66.5	66.3	58.3	12.0
12	29.98	29.66	29.819	86 0	2 P	41.0	5:30 A	63.5	67.0	63 0	10.3
13	29.76	29 64	29 712	87.0	4 P	62.5	2 A	74.7	75.3	65.7	12.2
14	29.99	29 68	29.882	75.5	4:30 P	60 0	5:30 A	67.7	67.0	58.0	12.7
15	30 06	29.97	30.023	81 5	3 P	53 5	4:30 A	67.5	68.7	60.5	13.0
16	30.09	30.02	30.077	84.0	5 P	52.5	5 A	68.3	69.5	62.5	13.5
17	30 06	29 89	29.976	86.0	3:30 P	50 5	5:30 A	68 3	69 8	62.0	11.5
18	29.91	29.69	29 803	78.0	6 P	62 0	9 A	70.0	67.4	63.3	4.5
19	29.76	29.70	29.755	85 5	5 P	56.5	5:30 A	71.0	72.0	66.3	11.7
20	29.84	29.74	29 823	87.0	2 P	57.0	6 A	72.0	67.8	63.3	8.5
21	30.03	29.83	29.934	82.5	4:30 P	53 0	5 A	67.7	66 6	61.5	11.3
22	30.13	30.03	30.099	87.5	4 P	52.0	5:30 A	69 7	70.8	61.3	12.7
23	30.12	29.99	30.055	87.5	3:30 P	63 0	5 A	75.3	74.3	65.5	10.0
24	30.00	29.82	29 867	77.5	11 A	67 0	12 P	72.3	71.4	66.7	1.5
25	30.12	29.82	29.995	79.0	4 P	54.0	12 P	66.5	67.8	57.5	12.7
26	30.19	30 05	30.154	85.0	4 P	44.0	5 A	64 5	67 0	56.7	10.5
27	30.15	30.02	30.117	89.5	3 P	53 5	5:30 A	71.5	72.0	63.0	10.2
28	30.10	30.01	30.076	80.5	0:30 P	62.0	5 A	71.3	70.3	68.5	5.0
29	30.09	29.92	30.013	93.5	4:30 P	70.5	5 A	82.0	78.8	73.5	7.7
30	30.07	29.91	29.985	90 5	5 P	67.5	6 A	79.0	78.8	69.7	11.3
31	30.19	30.07	30.149	88.0	4 P	60.0	5:30 A	74.0	73.4	63.0	12.8

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	69.5	1.051	69 5	S.	198	0.0	—	—				
2	65.5	.895	72.5	S.	80	0.0	—	—	5 P		T	
3	65.5	.839	76.5	S.	59	0.0	—	—				
4	66.0	.887	74.0	S.	149	0.0	—	—				
5	69.0	.968	74 0	S.	133	0.0	—	—				
6	63.5	.820	73 0	N.W.	182	2.0	20	4 P				
7	49 5	.551	65.0	W.N.W.	243	2.0	20	2 A				
8	51.0	.567	66.5	N.W.	88	0.0	—	—	3:30 P		T	
9	59.0	.655	78.5	S.S.E.	192	4.0	28	12 M				
10	58.0	.686	72 0	S.	324	3 0	24	2 P	5 A	6:30 A	.03	
11	50.5	.695	53.5	N.W.	162	1.0	14	9 A				
12	59.0	.706	72.0	S.	169	3.0	24	3 P	8 P	12 P	.30	
13	61.0	.819	67.5	S.S.W.	266	5 5	33	2 P	0 A	12 P	.14	
14	52.0	.644	60.5	W.N.W.	292	4.5	30	5 A				
15	55.0	.722	59 5	N.W.	112	0.5	10	3 P				
16	57.0	.776	60.5	N.N.W.	123	0.5	10	10 A				
17	58.5	.693	71.5	N.N.W.	69	0.0	—	—				
18	61.5	.623	90.0	S.	70	0.0	—	—	6 A	9 P	.14	
19	63 0	.775	75.5	N.	74	0.0	—	—				
20	60.5	.668	80.5	W.	46	3.5	26	4 P	3 P	8:30 P	.06	
21	57.0	.674	71.0	N.E.	80	1.0	14	11 A	11 A	4 P	.01	
22	55 5	.723	63.5	W.S.W.	69	0.0	—	—				
23	60.5	.822	65.5	S.S.W.	241	27.0	73	5 P	11:30 P		T	
24	64.5	.752	81.5	S.S.W.	161	0.0	—	—	11 A	11 P	.03	
25	51.0	.642	59 0	N.N.W.	160	1.5	17	4 P				
26	49.5	.637	57.5	S.W.	113	0 0	—	—				
27	59.0	.715	72.5	S.	134	0.0	—	—				
28	67.0	.766	86.0	S.S.E.	106	0.0	—	—	1 P	3 P	.86	
29	72.0	.939	84.5	S.S.E.	54	0.0	—	—	1 A	2 A	.02	
30	67.0	.879	75.0	N.E.	87	0.0	—	—				
31	57.0	.805	58.5	N.N.E.	79	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was unusually dry and clear. Prior to the heavy shower of the 28th, all the rainstorms were so light that they were of little benefit to vegetation. Following the unusually small rainfall of June, especially the entire absence of rain the latter part of that month, with less than one half an inch the first half of July, the ground near the surface was thoroughly dried out. While the shower of the 28th did much good, a great deal more rain is needed soon to mature growing crops.

High temperatures and much sunshine were also important features of the month.

Comparing the month's records with the normals for this station the following features are noted: The mean barometer was rather low, while the range was about the usual amount. Changes in pressure were generally slow and of small amount. The total wind movement was about 25 per cent more than the July normal and a comparatively large amount was from the south directions.

The mean temperature was about a degree and one-half higher than the normal, and the maximum of 100 degrees, on the 1st, has been exceeded but a few times here. The first and last weeks were the warmest parts of the month, while the coolest period was from the 7th to the 22d.

The total precipitation was about one-third the normal amount, and more than one-half the total occurred during a heavy thunder shower on the 28th. Distant thunder or lightning was noted on many more dates than usual.

The mean dew point and relative humidity were both considerably lower than the normals for these features.

The number of hours of bright sunshine recorded was one of the largest records ever taken at this station: the number of cloudy days noted was correspondingly small.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 296. AUGUST, 1913

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.12, 20th, 8 A.
Minimum reduced to freezing, 29.40, 29th, 11 P.
Reduced† maximum reading, 30.41, 20th, 8 A., 21st, 7 A.
Reduced† minimum reading, 29.69, 29th, 11 P.
Mean semi-daily reduced, ... 30.035
Monthly range, ... 0.72

***Air Temperature.** In Degrees Fahr.

Highest, ... 97.0, 17th, 3 P.
Lowest, ... 41.0, 26th, 6 A.
Mean hourly, ... 69.5
Mean of means of max. and min., ... 69.9
Mean sensible (wet bulb), ... 62.3
Monthly range, ... 56.0
Highest mean daily, ... 78.4, 18th
Lowest mean daily, ... 61.8, 25th
Mean maximum, ... 83.5
Mean minimum, ... 56.4
Mean daily range, ... 27.1
Greatest daily range, ... 43.0, 26th
Least daily range, ... 11.5, 29th

Humidity.

Mean dew point, ... 58.6
Mean force of vapor, ...688
Mean relative humidity, ... 74.2

Precipitation. In inches.

Total precipitation, ... 2.26
Number of days on which .01 inch or more rain fell, ... 10

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

Wind.

Total movement, ... 3441m.
Greatest daily movement, ... 254m., 22d
Least daily movement, ... 27m., 3d, 31st
Mean daily movement, ... 111 m
Mean hourly velocity, ... 4.6 m
Maximum pressure per square foot, 4.5 lbs.= 30m. per hour, 22d, 4 P., S.
Maximum velocity for 5 minutes, 24m. per hour, 22d, 2P., S.
Prevailing Direction, Southwest.

Summary.

South	19 per cent.
North Northeast	10 " "
West Northwest	13 " "
South Southwest	19 " "
West Southwest	10 " "
Other directions	29 " "

Weather.

Mean cloudiness observed, ... 41 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 147 hrs.=34 per cent.
Number of clear days, ... 13
Number of fair days, ... 13
Number of cloudy days, ... 5

Bright Sunshine.

Number of hours recorded, . . 282 hrs=66%.
Rain, 2d, 4th, 6th, 7th, 10th, 13th, 14th, 17th, 22d, 23d, 27th, 29th, 30th.
Thunder and Lightning, 4th, 27th, 29th, 30th.
Gales, 35 or more miles per hour: None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.19	29 98	30 061	74.0	6:30 P	60.0	2:30 A	67 0	68.1	64.7	2.0
2	29.99	29.89	29.946	89.0	2 P	64.0	12 P	76.5	75.0	64 5	10.9
3	29.97	29.80	29.896	89.5	3 P	55.5	5:30 A	72.5	72.7	63.3	12.1
4	29 97	29 81	29.886	80.0	4 P	59 0	12 P	69.5	68 3	61.7	5.7
5	30.15	29.97	30.117	84 0	3:30 P	49.5	5:30 A	66 7	67.2	59.3	12.0
6	30.15	29 99	30.075	81.5	1 P	58.0	5 A	69.7	69 7	63.0	5.7
7	30.10	29.99	30 032	84.0	4:30 P	63.0	5:30 A	73.5	72.1	66.3	10.0
8	30.16	30 08	30.137	87.0	2:30 P	54.0	5:30 A	70.5	71.5	65.3	11.8
9	30.14	29.89	29 977	86.0	3 P	65.5	4:30 A	75 7	75 4	70.5	4.0
10	29.98	29.81	29.892	88.0	3:30 P	63 0	12 P	75 5	76.3	68 7	7.0
11	30 21	29.98	30.104	78.0	3 P	50 5	6 A	64 3	64.2	53.5	11.8
12	30.28	30.17	30.224	80.0	3:30 P	44.5	6 A	62.3	62 8	54.3	11.3
13	30.19	30.06	30.135	77.5	3 P	54.0	6 A	65.7	65.1	60.5	7.3
14	30.16	30.07	30 135	79 0	4:30 P	53 5	5 A	66 3	64.6	59.3	7.5
15	30 14	30.03	30.093	85 5	4 P	55 0	6 A	70.3	69 8	62.7	11.5
16	30.09	29 90	29 984	94 0	4 P	57.0	6 A	75.5	74 9	66.3	11.0
17	29 97	29 89	29.944	97.0	3 P	62 5	6 A	79 7	77.7	70 3	8 5
18	30.07	29.95	29 983	91.0	12 M	68 5	6 A	79 7	78.4	72.5	9.0
19	30.32	30.07	30.231	86 0	4 P	57.0	12 P	71 5	71.7	59 5	11.0
20	30.41	30.32	30.388	83 0	4:30 P	49.5	6 A	66.3	65.8	56.5	12 0
21	30.41	30.20	30.305	79.0	4 P	47.0	6 A	63.0	63 6	54.7	11.1
22	30.20	29 83	29.959	78.0	1:30 P	50.5	5:30 A	64 3	65.3	60 3	8.2
23	29 93	29.73	29.819	81 0	2 P	61 0	12 P	71.0	71 4	64.5	10 3
24	29.95	29 82	29 904	83 0	3 P	53 0	6 A	68 0	67.1	60 0	11.5
25	30.07	29.89	30.056	77.5	4 P	50.5	6 A	64 0	61.8	52.3	11.6
26	30.07	29.92	30.012	84.0	3 P	41.0	6 A	62.5	63.8	56.3	11.0
27	30.02	29.88	29 972	83.5	3 P	65.0	12 P	74.3	72.6	66.0	5.9
28	30.09	29.96	30.030	86 0	3:30 P	54.5	6:30 A	70.3	69.8	61.5	10.1
29	29.96	29.69	29 779	76.0	5:30 P	64.5	8:30 A	70.3	69.7	67.7	1.5
30	30 01	29.72	29.885	82.0	3 P	62.5	12 P	72.3	69.9	63.3	8.8
31	30.20	30.01	30.131	83 0	3:30 P	54.0	6 A	68.5	68.7	62.0	10.2

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	63.5	.690	84 0	S.	105	0.5	10	1:30P				
2	60.5	.760	70.0	W.N.W.	78	0.0	—	—	1 A	2 A	T	
3	60.0	.701	74.5	W.N.W.	27	0.0	—	—				
4	59.0	.632	81.5	N.N.E.	85	0.0	—	—	7 A	11 A	.21	
5	54.5	.653	66 0	N.N.E.	62	0.0	—	—				
6	59.5	.683	77.0	S.	179	1.5	18	4 P	2 P	12 P	.03	
7	64.0	.750	80.5	N.	66	0.0	—	—	0 A	2 A	.01	
8	62.0	.731	72.0	S.	108	0.0	—	—				
9	68.0	.872	81.5	S.S.W.	195	0.0	—	—				
10	66.5	.830	79 0	W.	108	4.0	28	5 P	7:30 A	8 P	.01	
11	45.0	.582	51.5	N.N.W.	227	3.0	24	10 A				
12	48.5	.645	64.0	S.W.	62	0.0	—	—				
13	58.5	.593	82.0	S.S.W.	117	2.0	20	4 P	11 A	6:30 P	.18	
14	56.0	.594	77.5	S.E.	38	0.0	—	—	6 A		T	
15	59.5	.688	74.0	S.S.E.	72	0.0	—	—				
16	63.0	.863	74.0	S.	60	0.0	—	—				
17	68.5	.844	82.0	S.	50	1.0	14	3 P	4 P		T	
18	68.0	.916	81.0	E.	60	1.5	17	1 P				
19	53 5	.700	59.0	N.N.E.	143	0.5	10	6 P				
20	49.5	.627	57.5	S.	60	0.0	—	—				
21	49 0	.549	64.5	S.S.W.	147	1.5	17	5 P				
22	56.5	.634	73.5	S.S.W.	254	4.5	30	4 P	7 P	12 P	.24	
23	61.5	.713	77.5	W.N.W.	247	0.5	10	12 M	0 A	5 A	.20	
24	55.5	.643	69 0	W.S.W.	81	0.0	—	—				
25	46.5	.503	63.5	N.	94	1.5	—	—				
26	53.0	.555	77 5	S.S.W.	157	3 0	24	12 M				
27	64.0	.717	84 5	W.S.W.	146	1.0	14	2 A	1 A	3:30 P	.01	
28	56.5	.693	67.0	W.	58	0.0	—	—				
29	67.0	.718	94.0	S.S.W.	185	2.0	20	4 P	4:30 A	12 P	1.20	
30	61.5	.645	85.0	W.S.W.	143	0.0	—	—	0 A	4 A	.17	
31	59.0	.655	76 5	W.N.W.	27	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during August was especially marked by the small precipitation and large amount of sunshine. The droughty conditions, which were noted in July, continued up to nearly the end of August before any heavy rain occurred. On the 29th, heavy showers, with unusually severe thunder and lightning, did much to relieve the drought and replenish the water supplies in this vicinity.

An analysis of the records of the several weather elements for the month and comparison with the normals for this station shows the following as the more important features: The mean barometer was practically normal while the maximum and minimum were both above the normals for these records. The total wind movement was slightly greater than usual and a large amount was from the southwest quadrant. No gales were recorded during the month.

The mean temperature was about two degrees higher than the normal and the maximum temperature was an unusually high record for August. The minimum temperature was a degree lower than usual giving a large range for the month.

The mean dew point and relative humidity were both lower than the normal and the amount of sultry weather for the time of year was small.

The total precipitation was practically two inches less than the normal and nearly two-thirds of the total fell during the storm of the 29th. During this storm, thunder and lightning was nearly incessant for more than an hour.

The amount of sunshine was much greater than usual and but few cloudy days were noted.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 297. SEPTEMBER, 1913

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.28, 16th, 8 A.
Minimum reduced to freezing,	29.46, 13th, 4A.
Reduced† maximum reading,	30.58, 16th, 8 A.
Reduced† minimum reading,	29.75, 13th, 4 A.
Mean semi-daily reduced,	30.134
Monthly range,	0.83

***Air Temperature.** In Degrees Fahr.

Highest,	87.5, 2d, 2:30 P.
Lowest,	31.0, 15th, 6 A.
Mean hourly,	59.7
Mean of means of max. and min.,	60.0
Mean sensible (wet bulb),	54 2
Monthly range,	56.5
Highest mean daily,	73.8, 3d
Lowest mean daily,	48.0, 15th
Mean maximum,	71.7
Mean minimum,	48.3
Mean daily range,	23.4
Greatest daily range,	42.5, 16th
Least daily range,	5.0, 19th

Humidity.

Mean dew point,	51.0
Mean force of vapor,	.493
Mean relative humidity,	80.2

Precipitation. In inches.

Total precipitation,	2.56
Number of days on which .01 inch or more rain fell,	11

*Temperature in ground shelter.

†Reduced to freezing and sea-level.

Wind.

Total movement,	3220m.
Greatest daily movement,	293m., 22d
Least daily movement,	9m., 5th
Mean daily movement,	107 m
Mean hourly velocity,	4.5 m
Maximum pressure per square foot,	6.5 lbs.= 36m. per hour, 22d, 5 A., S.
Maximum velocity for 5 minutes,	24m. per hour, 13th, 1P., W.N.W.
Prevailing Direction,	Northwest.

Summary.

South	27 per cent.
North	17 " "
North Northeast	10 " "
North Northwest	10 " "
Other directions	38 " "

Weather.

Mean cloudiness observed,	47 per cent.
Total cloudiness recorded by the Sun Thermometer,	191 hrs.=51 per cent.
Number of clear days,	8
Number of fair days,	10
Number of cloudy days,	12

Bright Sunshine.

Number of hours recorded, 182 hrs=49%.

Rain, 2d, 4th, 5th, 7th, 8th, 13th, 17th, 18th, 19th, 20th, 21st, 22d.

Thunder and Lightning, none.

Frosts, 10th, 11th, 15th, 16th, 28th.

Gales, 35 or more miles per hour: 35m, 9th, N.; 36m, 22d, S.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.27	30.20	30.258	85 0	4 P	60.0	6 A	72.5	69.8	65.3	6.5
2	30.31	30.21	30.256	87.5	2:30 P	66.0	8 A	76.7	72.9	68 5	7.4
3	30.21	30.01	30.108	86.0	3:30 P	63.5	5:30 A	69.7	73.8	66.5	9.1
4	30.16	30.04	30.137	71.0	0 A	57.5	4 P	64 3	62.5	59 3	0.0
5	30.17	30.12	30.139	60.5	5 P	54.5	12 P	57.5	57.8	56.5	0.0
6	30.27	30.17	30.230	79.0	4 P	50.0	3:30 A	64.5	63.3	59.3	9.0
7	30.28	30.04	30.200	67.5	3 P	57.0	5 A	62.3	63.6	61.3	0.0
8	30.04	29.84	29.940	82 5	3 P	59 0	12 P	70.7	70.5	64.7	4.5
9	30.42	30.01	30.183	66.0	5 P	43.0	12 P	54 5	56.0	47.0	5.0
10	30.48	30.27	30.388	69.5	5 P	38.5	6 A	54 0	52.3	46.3	7.5
11	30.27	30 05	30.135	69.5	5 P	35.5	7 A	52.5	52 8	46.3	5 5
12	30.05	29.83	29.917	70.5	3:30 P	46.0	4:30 A	58.3	57.4	53.0	4.0
13	30.08	29.75	29.890	70.0	2 P	48 0	12 P	64.0	60.7	51.3	10.0
14	30 43	30.08	30.301	64.0	3:30 P	38 0	6 A	51.0	50.5	44 7	11.0
15	30.56	30.43	30.534	68.0	4 P	31.0	6 A	48.5	48.0	41.5	11.0
16	30.58	30.43	30.510	74.0	3 P	31.5	6:30 A	52.7	52.3	45 5	10.7
17	30.43	29.99	30.201	75.0	3:30 P	47.0	3 A	61.0	60.7	56.5	6.0
18	29.99	29.83	29.884	73.0	2:30 P	59.0	12 P	66 0	66 4	60.5	1.6
19	29 99	29 92	30.002	59.0	0 A	54.0	12 P	57.5	56.3	53.5	0.0
20	30 02	29.98	30.012	61 0	4 P	53.5	3 A	57.3	57.0	55.5	0 0
21	29 99	29.82	29 924	73.0	12 P	57.0	5:30 A	65 0	64.5	62.7	0.2
22	30.00	29.80	29 847	73.0	0 A	57.0	12 P	65 0	67.1	64.3	0.6
23	30.26	30.00	30.220	67.5	3:30 P	46.0	6 A	56 7	55.9	49.0	10.1
24	30.35	30.26	30.322	71.0	4 P	39.5	6:30 A	55.3	54.3	48.3	10.3
25	30.30	30.14	30.235	77.0	2:30 P	40.5	5:30 A	58.7	58.5	50.7	10.0
26	30.14	29.88	29.983	78.5	3:30 P	48.0	7 A	63.3	62.4	55.7	9.5
27	30.21	29.91	30.066	67.5	4 P	45.0	12 P	56.3	58.3	49.7	10.0
28	30.32	30.12	30.183	70.0	3 P	33.5	6:30 A	51.7	51.7	43.3	10.6
29	30.12	29.87	29 934	76.5	3:30 P	46.5	7 A	61.5	58.7	50 7	7 7
30	30.11	29.98	30.088	59 5	3 P	45.0	6 A	52.3	53.5	49 7	4 5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	64 0	.677	89.5	S.	63	0.5	10	4 P				
2	67.5	.732	94 0	S.	81	0.0	—	—	3 A	4 A	.01	
3	64.0	.755	80.5	S.	143	0.5	10	3 P				
4	57.5	.545	86 0	N.N.E.	95	0.0	—	—	8 A	12 P	.52	
5	55.5	.477	93.0	N.N.E.	9	0.0	—	—	0 A	8:30 A	.67	
6	57.5	.546	89.5	W.	41	0.0	—	—				
7	59.5	.586	89.5	S.	86	0.0	—	—	3 P	12 P	.04	
8	62.0	.701	80.5	W.N.W.	100	3.5	26	5 P	5:30 P		T	
9	40.5	.414	61.0	N.	219	6.0	35	9 A				
10	42.0	.360	75.0	N.	97	1.0	14	1 P				
11	42.5	.360	77.0	N.E.	29	0.0	—	—				
12	50.5	.447	85.5	E.S.E.	49	0.0	—	—				
13	44.5	.485	62.0	W.N.W.	259	5.0	32	2 P	0 A	4 A	.10	
14	39.5	.351	79.5	N.N.W.	122	1.0	14	9 P				
15	37.5	.298	76.0	N.N.W.	57	0.0	—	—				
16	41.0	.361	74.5	N.	51	0.0	—	—				
17	53 5	.527	81.5	S.	197	2.0	20	5 P	3 A	12 P	.08	
18	58.5	.583	85.0	S.	129	4.0	28	10 A	0 A	12 P	.13	
19	52.5	.433	91.0	N.	103	0.0	—	—	0 A	12 P	.18	
20	54.0	.462	89.5	N.N.E.	80	0.0	—	—	7 P	12 P	.11	
21	61.5	.611	92.0	S.E.	122	0.5	10	10 A	0 A	12 P	.23	
22	62.5	.683	85.0	S.	293	6.5	36	5 A	0 A	3 P	.49	
23	45.0	.410	72.5	N.W.	104	0.5	10	1 P				
24	45.0	.385	77.5	N.	36	0.0	—	—				
25	47.5	.434	80.0	W.	41	0.0	—	—				
26	54 0	.491	88.0	S.	113	0.5	10	5 P				
27	43.5	.454	62.5	N.N.W.	200	2.5	22	9 A				
28	36.5	.348	63.5	S.W.	110	0.5	10	4 P				
29	46.5	.444	73 0	S.W.	139	0.5	10	2 P				
30	44.5	.429	70 5	N.E.	52	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during September was generally seasonable, although some of the weather elements showed considerable departures from their normals. The precipitation was much below the normal amount, although slightly greater than that of the preceding month. Every month since May has shown a marked deficiency in rainfall, and the accumulated deficiency since June 1st is nearly ten inches. The generally high barometer during the month was an important if not particularly noticeable feature.

A comparison of the records of the several elements with the normals shows the following interesting features: The mean barometer was the highest for that feature since 1894; the maximum and minimum pressures were both considerably greater than usual, while the range was nearly a normal value. The total wind movement was slightly below the average, and comparatively few days showed a large daily movement. More than the usual amount was from the South. Only two light gales were noted.

The mean temperature was slightly lower than the normal, while the maximum and minimum records were both close to the normal values for those records. The first frost was noted on the 10th, and killing frosts on the 15th and 16th. The coldest day was about the middle of the month,

The mean dew point was about three degrees lower than the normal, and the relative humidity was considerably greater than usual.

The total precipitation was about sixty per cent of the usual amount, and about one-half the total occurred during the equinoctial period. Water supplies are at a low stage in this vicinity.

The month was slightly more cloudy than usual.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 298. OCTOBER, 1913

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.21, 23d, 8 A.
Minimum reduced to freezing, 28.85, 20th, 9P.
Reduced† maximum reading, 30.52, 23d, 8 A.
Reduced† minimum reading, 29.14, 20th, 9 P.
Mean semi-daily reduced, ... 29.970
Monthly range, ... 1.38

***Air Temperature.** In Degrees Fahr.

Highest, ... 79.0, 10th, 4 P.
Lowest, ... 24.5, 31st, 12 P
Mean hourly, ... 54.7
Mean of means of max. and min., ... 55.5
Mean sensible (wet bulb), ... 50.3
Monthly range, ... 54.5
Highest mean daily, ... 68.0, 10th
Lowest mean daily, ... 33.8, 31st
Mean maximum, ... 63.5
Mean minimum, ... 47.5
Mean daily range, ... 16.0
Greatest daily range, ... 31.0, 23d
Least daily range, ... 4.5, 1st

Humidity.

Mean dew point, ... 46.5
Mean force of vapor, ...424
Mean relative humidity, ... 79.2

Precipitation. In inches.

Total precipitation, ... 5.16
Number of days on which .01 inch or more rain fell, ... 15
Total snow in inches . . . . . Trace

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

Wind.

Total movement, ... 4698m.
Greatest daily movement, ... 490m., 21st
Least daily movement, ... 13m., 9th
Mean daily movement, ... 151 m
Mean hourly velocity, ... 6.3 m
Maximum pressure per square foot, 23.0 lbs.= 68m. per hour, 14th, 1P., N.N.E.
Maximum velocity for 5 minutes, 36m. per hour, 20th, 8P., S.S.W.
Prevailing Direction, North.

Summary.

North . . . . . 26 per cent.
North Northeast . . . . . 16 " "
Northwest . . . . . 10 " "
Other directions . . . . . 48 " "

Weather.

Mean cloudiness observed, ... 63 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 250 hrs.=73 per cent.
Number of clear days, ... 3
Number of fair days, ... 10
Number of cloudy days, ... 18

Bright Sunshine.

Number of hours recorded, . . 91 hrs=27%.

Rain, 1st, 2d, 7th, 8th, 9th, 11th, 12th, 13th 14th, 15th, 18th, 19th, 20th, 24th, 25th, 26th, 27th, 28th, 30th.

Snow, 31st.

Hail, 14th.

Frosts, 22d, 23d, 31st.

Thunder and Lightning, none.

Gales, 35 or more miles per hour: 68m, 14th, N.N.E.; 44m, 20th, S.S.W.; 35m, 21st, W.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.09	29.73	29.950	53.5	12 P	49.0	6 A	51.3	50.9	48.5	0.0
2	29.73	29.25	29.378	59.5	3 P	53.5	0 A	56.5	56.4	54.7	0.0
3	29.68	29.33	29.565	65.5	1 P	46.5	6:30 A	56.0	56.5	50.5	6.5
4	29.91	29.68	29.826	71.5	3:30 P	53.5	6 A	62.5	61.4	54.0	9.1
5	30.11	29 91	30.047	78.5	3 P	55.0	5:30 A	66.7	64.0	55.3	7.9
6	30.22	30.11	30.197	68.5	3 P	46.5	4:30 A	57.5	58.4	55.7	0.5
7	30.26	30.21	30.248	68.0	3 P	60.5	0:30 A	64.3	63.6	61.0	0 0
8	30.23	30.15	30.192	74.5	4 P	61.5	5:30 A	68.0	66.5	62.5	3.7
9	30.16	30.10	30.135	73.5	12:30 P	63.5	5:30 A	68.5	67.2	63.5	3.1
10	30.18	30.09	30.139	79.0	4 P	63.5	6 A	71.3	68.0	63.7	5.7
11	30.15	29.94	30.051	69.5	11:30 A	62.0	6 A	65.7	64 6	60.7	0.6
12	29.99	29.91	29.958	62.0	4 P	55.0	8 A	58.5	55.3	50.5	2.2
13	30.07	29.90	30.006	52.5	12:30 P	35.5	7 A	44.0	44.4	40.7	0.0
14	30.09	29.78	29.960	57 0	3 P	37.5	6:30 A	47.3	47.5	38.0	5.1
15	29.89	29.76	29 885	62.5	2 P	43.5	6 A	53 0	51.9	56.5	4.7
16	30 03	29.82	29.923	68.0	1 P	52.7	3 A	60.3	58.4	51.5	4.5
17	30.10	30.03	30.079	71.0	3:30 P	47.5	5:30 A	59.3	58.0	52.3	9.7
18	30.06	29.91	29.983	66.0	1 P	45.5	6:30 A	55 7	57.3	53.0	3.0
19	30.02	29.76	29.943	57.0	0 A	49 5	12 P	53.3	53.2	49.0	0.0
20	29.76	29.14	29.233	65 0	6 P	49.5	0 A	57.7	58.7	57.0	0.2
21	30.02	29.23	29 693	54.5	12:30 P	42.0	12 P	48.3	48.1	40.7	4 2
22	30.41	30.02	30.347	57.5	3:30 P	29.5	7 A	43.5	41.7	33.0	9.2
23	30.52	30.38	30.465	60.0	3 P	29 0	6:30 A	44 5	44.3	36.7	8.3
24	30.38	29.92	30.152	61.0	12 P	43 0	3 A	52.0	49 7	48.5	0.0
25	29.92	29.81	29.877	64.0	3 P	59.0	12 P	61 5	62.3	60.7	0.0
26	29.86	29.74	29.809	60.5	5:30 A	51.0	12 P	55.7	55.3	53.5	0.0
27	29.98	29.80	29 939	62.5	4 P	43.5	12 P	53.0	51.7	47.7	6.7
28	29.98	29.80	29.911	69.0	3:30 P	42.0	3 A	55.5	52.3	50.3	1.4
29	30.00	29 79	29 915	66.0	3:30 P	39.5	6:30 A	52.7	50.4	44.0	8.5
30	30.10	29 73	29.925	50.5	12:30 P	38.5	12 P	44.5	44.5	39.3	4.3
31	30.37	30.10	30.274	42.0	12:30 P	24.5	12 P	33.3	33.8	27.3	2.9

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	46.5	.364	88.5	S.E.	95	0.0	—	—	3 A	12 P	.35	
2	54.0	.457	89.5	N.N.W.	120	0.0	—	—	0 A	9 P	.23	
3	46.5	.429	75 0	N.N.W.	144	3.0	24	11 P				
4	48.5	.523	66.5	N.	383	4.5	30	10 A				
5	51.0	.526	72.0	N.	200	1.0	14	2 A				
6	53.5	.489	87.0	N.	41	0.0	—	—				
7	59.5	.583	87.0	N.	23	0.0	—	—	5 P	12 P	T	
8	61.0	.613	88.0	S.S.E.	22	0.0	—	—	7 P	12 P	.01	
9	62.0	.623	91.0	E.	13	0.5	10	6 P	0 A	2 P	.01	
10	62.0	.638	88.5	S.	31	0.0	—	—				
11	59.0	.577	86.5	S.S.E.	107	0.0	—	—	10 P	12 P	.01	
12	49.5	.383	93.5	N.N.E.	125	4 5	30	11 A	0 A	9 A	.74	
13	39.0	.275	87.5	N.	65	2.0	20	9 P	12 M	6 P	.13	
14	27.5	.293	53.5	N.	413	23.0	68	1 P	4 P	9 P	.10	
15	40.5	.385	66.5	N.N.E.	361	4.5	30	7 P	5 P		T	
16	47.0	.458	70.0	N.N.E.	339	5.0	32	1 P				
17	49.5	.446	78.5	N.N.E.	134	1.5	17	11 A				
18	50.5	.448	84.0	S.S.W.	87	0.0	—	—	8 P	12 P	.09	
19	46.5	.383	84.0	N.	130	0.0	—	—	0 A	12 P	.09	
20	54.0	.525	82.0	S.S.W.	285	9.5	44	9 P	0 A	6 P	.76	
21	33 0	.313	60.0	W.S.W.	490	6.0	35	12 M				
22	25 5	.221	63.0	N.	88	0.0	—	—				
23	31.5	.259	71.0	N.E.	60	0.0	—	—				
24	46.5	.367	88.5	S.E.	27	2.5	22	10 P	10 A	12 P	.26	
25	60.0	.559	93.5	S.	160	2.0	20	1 A	0 A	12 P	1.67	
26	52.5	.437	91.0	N.N.E.	167	0.0	—	—	0 A	12 P	.65	
27	45.0	.363	83.0	W.S.W.	88	0.0	—	—	0 A	4 A	T	
28	47.5	.424	83.5	W.	72	0 0	—	—	12 M	12:30 P	.06	
29	40.5	.321	80.5	N.W.	54	0.0	—	—				
30	31.0	.299	59.5	N.W.	194	3.0	24	9 A	3 P		T	
31	19.5	.171	63.5	N.N.W.	180	3.5	26	1 P	10 A			T

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

During October the most noticeable feature of the weather was the large amount of cloudiness and the frequency of precipitation. Precipitation occurred on twenty dates and a measureable amount on fifteen days. For the first time since May the monthly precipitation was more than the normal. Several rainstorms of moderate amount occurred prior to the 21st. The storm of the 24th-26th, however, was by far the heaviest of the month. One half the total precipitation occurred at this time and the drought which had prevailed for several months was effectually broken. Notwithstanding the large amount of cloudiness the month was much warmer than usual.

An analysis of the records of the several weather elements shows the following as the more important features: The mean barometer was considerably lower than the normal and the range larger than usual. The maximum pressure for the month followed the minimum in less than two and one-half days. The total wind movement was large for the time of year and an unusually large amount was from the North.

The mean temperature was about five degrees above the normal while the maximum was practically normal. The minimum temperature was slightly higher than the normal for this element and was reached at midnight of the last day of the month. Until the last day the minimum for the month was 29 degrees, an exceptionally high figure.

The mean dew point was about five degrees higher than usual and the relative humidity about five points above the normal.

The total precipitation was about forty per cent more than the normal and was well distributed. A light snow flurry occurred on the last day of the month.

Only three gales were registered during the month; the one on the 14th was unusually heavy for this locality.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 299. NOVEMBER, 1913

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.41,28th,11 A.M.
Minimum reduced to freezing, 28.78, 9th, 5 P.M.
Reduced† maximum reading, 30.72, 28th, 11 A.M.
Reduced† minimum reading, 29.07, 9th, 5 P.M.
Mean semi-daily reduced, ... 30.129
Monthly range, ... 1.65

***Air Temperature.** In Degrees Fahr.

Highest, ... 68.0, 20th, 12 M.
Lowest, 23.0, 1st,5:30A.M; 27th,7:30A.M; 28th,4:30A.M.
Mean hourly, ... 41.6
Mean of means of max. and min., ... 41.8
Mean sensible (wet bulb), ... 36 6
Monthly range, ... 45.0
Highest mean daily, ... 58.5, 9th
Lowest mean daily, ... 28.5, 28th
Mean maximum, ... 50.7
Mean minimum, ... 32.9
Mean daily range, ... 17.8
Greatest daily range, ... 40.5, 6th
Least daily range, ... 3.5, 16th

Humidity.

Mean dew point, ... 32.1
Mean force of vapor, ...259
Mean relative humidity, ... 74.0

Precipitation. In inches.

Total precipitation, ... 2.11
Number of days on which .01 inch or more rain fell, ... 9
Total snow in inches 2.5

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

Wind.

Total movement, ... 5003m.
Greatest daily movement, ... 497m., 10th
Least daily movement, ... 37m., 6th
Mean daily movement, ... 167 m
Mean hourly velocity, ... 7.0 m
Maximum pressure per square foot, 14.5 lbs.= 54m. per hour, 23d, 1P.M., N.W.
Maximum velocity for 5 minutes, 39m. per hour, 9th, 5P.M., S.E.
Prevailing Direction, Northwest.

Summary.

North	13 per cent.
North Northwest	13 " "
Northwest	17 " "
West Northwest	10 " "
South Southwest	10 " "
Other directions	37 " "

Weather.

Mean cloudiness observed, ... 53 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 180 hrs.=61 per cent.
Number of clear days, ... 4
Number of fair days, ... 10
Number of cloudy days, ... 16

Bright Sunshine.

Number of hours recorded, . . 113 hrs=39%.
Rain, 3d, 4th, 8th, 9th, 13th, 14th, 19th, 20th, 24th, 28th, 29th.
Snow, 16th, 28th, 29th.
Hail,
Frosts,
Thunder and Lightning,
Gales, 35 or more miles per hour: 38m, 1st, W; 43m, 4th, N.W.; 53m, 9ht, S.E.; 41m, 10th, S.S.W.; 54m, 23d, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.37	30.06	30.187	47.5	3:30 P	23.0	5:30 A	35.3	37.7	33 7	6.1
2	30.36	30.12	30.308	51.0	3 P	34.0	12 P	42.5	43.6	37.0	2.0
3	30.40	30.08	30.291	54.0	2:30 P	32.0	6 A	43.0	42.5	37.3	2.2
4	30.09	29.93	29.999	52.5	12 M	40.0	12 P	46.3	45.8	39.5	4.4
5	30.28	30.09	30.255	49.0	2 P	30.0	12 P	39.5	38.0	30.5	8.5
6	30.30	30.21	30.263	65.0	3 P	24.5	7 A	44.7	42.0	34 0	8.6
7	30.23	30.10	30.184	66.5	3 P	27.5	7 A	47.0	44 2	35.5	7.5
8	30.12	29.76	29.961	58.0	12 P	34.5	5 A	46.3	45.4	46 3	0 0
9	29.76	29.07	29.365	64.5	2 P	49.0	12 P	56.7	58.5	55.3	0.0
10	29.77	29 32	29.638	49.0	0 A	31.0	12 P	40.0	40.3	32.5	3.0
11	30.02	29.77	29 9 9	38.5	3 P	24.5	7:30 A	31.5	32.5	28 0	6.0
12	30.24	30.02	30.203	46.5	2:30 P	32.0	9 P	39.3	37.4	31.7	6 0
13	30.19	30.03	30.094	52.0	4 P	36 0	0 A	44 0	44.7	40.7	0.1
14	30.22	29.99	30.093	47.0	12 M	32.0	12 P	39.5	42.5	38 0	0.0
15	30 31	30.21	30.255	43.5	2:30 P	25.5	7:30 A	34.5	33 9	28.0	7.1
16	30 21	30.00	30.092	33.5	1 P	30.0	7 A	31.7	31.8	30.7	0.0
17	30.07	29.98	30.017	48.5	3:30 P	29.5	7 A	39.0	36.8	32.0	8.7
18	30.01	29.91	29.985	59.0	2 P	30 5	7:30 A	44.7	44.0	37.3	6.2
19	30.08	29.87	29.995	55.0	12 M	44 5	0:30 A	49 7	50.8	46.7	0.5
20	30.07	29.82	29.939	68 0	12 M	49.5	12 P	58.7	58.3	51.3	7 5
21	30.30	30.07	30.263	60.0	3 P	35.0	7:30 A	47.5	47.2	40.0	8.0
22	30.29	30.04	30.195	64.0	3 P	47.0	3 A	55.5	54.5	51.5	3.5
23	30.04	29.81	29.932	65.0	11:30 A	43 0	12 P	54.0	52.5	46.7	2.3
24	30.02	29.84	29.952	43 0	0 A	30.5	6:30 A	36.7	37 1	32.3	0.4
25	30.20	30.00	30.157	43.5	3:30 P	33.0	8:30 P	38.3	36.8	30.7	7.0
26	30.31	29.95	30.103	50.0	3 P	28.0	12 P	39 0	40.0	32.7	1.8
27	30.63	30.31	30.585	36.0	3 P	23.0	7:30 A	29.5	29.5	25.0	6.0
28	30.72	30 54	30.647	32.5	2 P	23 0	4:30 A	27.7	28.5	27.7	0.0
29	30.54	30 42	30.469	38.0	4 P	31.0	3 A	34.5	33.9	33.5	0 0
30	30.55	30.47	30.520	40.0	3 P	33.5	7:30 A	36.7	36.5	33.3	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	27.0	.233	69.5	W.N.W.	231	7.0	38	11 A				
2	30.0	.263	64.5	N.N.W.	209	1.0	14	11 A				
3	32.5	.258	73.0	S.S.W.	116	1.0	14	3 P	8 A		T	
4	33.5	.285	70.0	N.W.	334	9.0	43	1 A	1 A	10 A	.05	
5	36.0	.198	49.5	N.W.	209	1.5	17	2 A				
6	26.0	.247	62.5	N.W.	37	0.0	—	—				
7	30.0	.255	73.0	S.	65	0.5	10	3 P				
8	45.5	.344	93.5	W.	46	0.0	—	—	5 A	12 P	.13	
9	53.5	.478	85.5	S.E.	336	14.0	53	5 P	0 A	9 P	.65	
10	23.5	.221	58.5	S.S.W.	497	8 5	41	1 P				
11	20.0	.180	63 0	S.W.	236	1.0	14	5 P				
12	25.0	.205	68.0	W.N.W.	215	1.0	14	8 A				
13	34.5	.302	67.0	S.S.W.	185	0.5	10	4 P	12 M		T	
14	33 0	.257	75.0	N.	85	0.5	10	9 P	9 A	2 P	.12	
15	20.5	.177	65.5	N.N.W.	89	0.0	—	—				
16	29.0	.175	95.0	N.N.W.	46	0.0	—	—	2 A	11 P	.20	.5
17	28.5	.195	84.5	N.	76	0.0	—	—				
18	33.0	.260	74.5	S.W.	88	0.0	—	—				
19	43.5	.361	80.0	S.E.	71	1.0	14	12 P	9 A	12 P	.01	
20	47.0	.451	72.5	W.S.W.	289	5.5	33	1 P	0 A	5 A	.11	
21	35.5	.288	77.0	N.	49	0.5	10	9 P				
22	49.0	.410	87.5	S.	165	0.0	—	—				
23	42.0	.372	74.5	W.N.W.	263	14.5	54	1 P				
24	26.5	.204	72.5	N.W.	82	1.5	17	10 P	11 A	3 P	T	
25	22.5	.203	60.5	N.N.W.	247	2.5	22	3 A				
26	29.0	.243	69.0	N.W.	249	2.5	22	7 P				
27	18.5	.152	69.0	N.E.	119	0.5	10	3 A				
28	26.5	.154	94.0	N.N.E.	70	0 0	—	—	2 P	12 P	.12	1.0
29	30.5	.199	85.5	N.	152	2.5	22	6 P	0 A	12 M	.69	1.0
30	30.5	.202	85.5	N.N.E.	147	1.0	14	9 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was considerably warmer than usual at this time of year and a comparatively small range of temperature. A comparatively high barometer, with a considerable number of gales was also a feature of more than passing interest. The precipitation was much less than the November average.

An examination of the records of the several weather elements and comparison with the means for the month shows the following features of interest: The mean barometer was nearly one-tenth of an inch higher than the normal for November and the range was unusually large. On the 9th a rapid fall was noted, culminating in the lowest record for the month. During the last week of the month an unusually high barometer prevailed.

The total wind movement was large and two gales of more than 50 miles per hour were registered on the pressure chart. Much of the wind was from the Northwest quadrant.

The mean temperature was about four degrees higher than the normal and the maximum and minimum for the month were both high—the minimum being more than eleven degrees higher than the normal for this element for November. The range was unusually small. The range on the 6th was nearly as large as the total range for the month.

The mean dew point was high and the relative humidity less than the normal value.

The total precipitation was about two-thirds of the normal and was fairly well distributed throughout the month.

The ground was frozen but little during the month. As a result the last snow and rainfall added considerably to the moisture in the ground.

The amount of sunshine recorded was slightly less than the normal.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 300. DECEMBER, 1913

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.16, 1st, 0 A.
Minimum reduced to freezing,	28.82, 8th, 3 A.
Reduced† maximum reading,	30.47, 1st, 0 A.
Reduced† minimum reading,	29.13, 8th, 3 A.
Mean semi-daily reduced,	30.013
Monthly range,	1.34

*Air Temperature. In Degrees Fahr.

Highest,	53.0, 7th, 6P.; 14th, 2P.
Lowest,	5.0, 28th, 8:30A.
Mean hourly,	31.3
Mean of means of max. and min.,	32.0
Mean sensible (wet bulb),	27.4
Monthly range,	48.0
Highest mean daily,	43.7, 5th
Lowest mean daily,	12.4, 28th
Mean maximum,	40.7
Mean minimum,	23.3
Mean daily range,	17.4
Greatest daily range,	27.5, 30th
Least daily range,	7.5, 25th

Humidity.

Mean dew point,	23.5
Mean force of vapor,	.169
Mean relative humidity,	81.2

Precipitation. In inches.

Total precipitation,	3.38
Number of days on which .01 inch or more rain fell,	9
Total snow in inches	4

Temperature in ground shelter.

Reduced to freezing and sea-level.

Wind.

Total movement,	4400m.
Greatest daily movement,	350m., 8th
Least daily movement,	11m., 29th
Mean daily movement,	142 m
Mean hourly velocity,	5.9 m

Maximum pressure per square foot, 7.0 lbs.= 37m. per hour, 26th, 7A., N.N.E.

Maximum velocity for 5 minutes, 33m. per hour, 8th, 5A., W.N.W.

Prevailing Direction, North Northwest.

Summary.

Northwest	19 per cent
North Northeast	19 " "
North	10 " "
South	10 " "
South Southwest	10 " "
West Northwest	10 " "
North Northwest	10 " "
Other directions	12 " "

Weather.

Mean cloudiness observed,	45 per cent
Total cloudiness recorded by the Sun Thermometer,	162 hrs.=57 per cent.
Number of clear days,	7
Number of fair days,	10
Number of cloudy days,	14

Bright Sunshine.

Number of hours recorded, 121 hrs=43%.

Rain, 1st, 7th, 8th, 23d, 24th, 25th, 26th.

Snow, 8th, 10th, 11th, 18th, 25th, 26th.

Days of Sleighing, 5.

Gales, 35 or more miles per hour: 36m, 8th, W.N.W.; 36m, 14th, W.; 37m, 26th, N.N.E.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.47	30.35	30.399	42.0	4:30 P	34.0	7:30 A	38.0	37.3	36.5	0.0
2	30.39	30.17	30.335	43.0	3 P	29.0	7 A	36.0	36.3	34.0	0.0
3	30.17	29.92	29.969	49.0	11:30 A	33.0	12 P	41.0	40.5	37.0	7.0
4	29.92	29 54	29.704	43.0	3 P	31.0	7 A	37.0	39.0	34 7	0.2
5	29.66	29.53	29.608	50.5	1:30 P	37.0	7 A	43 7	43.7	37.7	7.7
6	30.15	29.66	30.067	48.0	2 A	30.0	12 P	39.0	39 5	30.7	7.9
7	30.10	29.18	29.589	53.0	6 P	29.0	1 A	41.0	40.4	41.0	0.0
8	29.94	29.13	29.545	46.0	0 A	27.0	8 A	36.5	29.3	24.0	0.0
9	30.25	29.94	30.232	39 0	3 P	20.5	6 A	29 7	27.0	22.3	7.5
10	30.17	29.76	29.923	36.0	5:30 P	19.5	4:30 A	27.7	28.5	26.5	1.5
11	30.12	29.73	29.955	33.0	1 P	16 0	12 P	24.5	26 8	23.7	2.7
12	30.13	29.96	30.036	41.5	3:30 P	14.5	6 A	28 0	25 9	21.3	6.0
13	30.11	30.02	30.073	48.5	2 P	22.0	7:30 A	35.3	34.4	26.7	6.7
14	30.04	29.78	29.889	53.0	2 P	26.5	6 A	39.7	39 1	33.7	6.2
15	30.23	29.98	30.191	40.0	0 A	25.5	12 P	32.7	30.7	24.7	7.7
16	30.17	29.95	30.028	34 0	12 P	24 5	1 A	29.3	30.0	30.3	0.0
17	29.99	29.79	29.881	49.5	3 P	34 0	0 A	41.7	40.7	34.3	6.3
18	29.95	29.71	29.797	43.5	1:30 A	23.5	12 P	33.5	34.6	31.0	3.0
19	30.15	29.95	30.097	31.0	2:30 P	16.5	8 A	23.7	23.0	18.3	7.3
20	30.06	29.91	29 989	41.0	3:30 P	17.0	7:30 A	29 0	29.3	25 3	4.0
21	30 01	29.90	29 979	43.5	3 P	27.0	7:30 A	35.3	35.4	30.3	2.2
22	30.43	30.01	30 488	42.0	2 P	28 5	12 P	35.3	33 6	27.7	4.3
23	30.44	30.01	30.483	37.5	4 P	28.5	0 A	33 0	32 5	31.0	0 0
24	30.04	29 88	29 667	43 0	2 P	29.0	11 P	36.0	35.1	31.5	4.3
25	30.08	29.74	29.953	34.5	4 P	27 0	8 A	30.7	31 0	28.7	0.0
26	29.74	29 25	29 479	33.5	12 M	20.5	12 P	27.0	29.5	27.7	0.0
27	30.35	29.66	30.189	29 5	3:30 P	16.5	8 A	23.0	20.5	15.0	7.9
28	30.36	30 26	30.313	28 5	3:30 P	5.0	8:30 A	16.7	13 4	8.5	5.5
29	30.29	30.04	30.172	33.0	3 P	6.0	8 A	19.5	15.7	11.3	7.5
30	30.05	29 92	29.981	37 0	4 P	9.5	2:30 P	23.3	22.0	22.7	2.5
31	30.13	30.03	30.099	35.0	2 P	14.0	7:30 A	24.5	25.1	21.3	4.7

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	35.0	.223	93.5	N.N.E.	12	0.0	—	—	5 A	12 P	.02	
2	32.0	.204	91.5	N.N.E.	21	0.0	—	—				
3	34.5	.234	86.5	N.	216	4.0	28	11 A				
4	29.0	.229	71.5	N.W.	128	0.5	10	11 P				
5	32.5	.263	71.0	N.W.	229	1.5	17	2 P				
6	23.5	.197	67.5	N.N.E.	187	0.0	—	—				
7	39.5	.274	96.0	S.S.W.	89	3.0	24	2 P	4 A	12 P	1.11	
8	17.0	.147	66.0	N.W.	350	6 5	36	5 A	0 A	5 P	.12	½
9	15.0	.137	67 0	N.N.W.	181	1.0	14	1 A				
10	21.0	.163	73.5	S.S.W.	186	0.0	—	—	8 P	12 P	.04	½
11	20.0	.137	84.0	N.W.	203	3.5	26	4 P	8 A	10 A	.04	½
12	17.5	.125	83.5	S.S.W.	140	0.0	—	—				
13	24.5	.161	86.0	N.E.	69	3.0	24	1 P				
14	29.0	.223	76 0	W.N.W.	177	6.5	36	12 M				
15	20.0	.147	74.5	W.N.W.	286	3.0	24	1 A				
16	28.5	.173	92.5	S.	45	0.0	—	—				
17	30.5	.217	78.0	S.	158	1.0	14	3 P				
18	28 0	.181	87.0	N.W.	122	4.5	30	9 P	7 P			T
19	12.0	.112	71.5	N.W.	247	2.5	22	5 A				
20	20.5	.159	77 0	S.S.E.	101	2.0	20	6 P				
21	28.0	.174	90.0	S.	52	2.0	—	—				
22	22.0	.168	73.5	N.N.E.	99	1.5	17	11 A				
23	27.5	.185	85.0	N.E.	140	1.5	17	6 P	4:30 P	12 P	.82	
24	29.0	.187	85.5	N.	167	3.0	24	7 A	0 A	4 A	.50	
25	27.0	.165	92.0	N.N.E.	31	0.5	10	11 P	6:30 P	12 P	.33	½
26	25.0	.161	86 0	N.	347	7.0	37	7 A	0 A	5 P	.40	2
27	0.5	.098	62.5	N.N.E.	268	3 5	26	8 A				
28	5.5	.070	84.0	N.N.W.	36	0.0	—	—				
29	7.0	.081	82.0	W.N.W.	11	0.0	—	—				
30	21.5	.130	92.5	N.N.W.	49	1.5	17	8 P				
31	19.0	.124	89.0	S.W.	53	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

Annual Summary for 1913.

Pressure. In inches.

Maximum reduced to freezing, ... 30.56, Mar. 18th, 8 A.
Minimum reduced to freezing, ... 28.25, Jan. 3rd, 6 P.
Maximum reduced to freezing and sea-level, ... 30.88, Mar. 18th, 8 A.
Minimum reduced to freezing and sea-level, ... 28.55, Jan. 3rd, 6 P.
Mean reduced to freezing and sea-level, ... 30.037
Annual range, ... 2.33

***Air Temperature.** In degrees Fahr.

Highest, ... 100.0, July 1st, 3 P.
Lowest, ... — 4.5, Feb. 10th, 7:30 A.
Mean hourly, ... 49.3
Mean of means of max. and min., ... 49.6
Mean sensible (wet bulb), ... 44.2
Annual range, ... 104.5
Highest mean daily, ... 81.8, July 1
Lowest mean daily, ... 7.1, Feb. 10
Mean maximum, ... 60.3
Mean minimum, ... 38.9
Mean daily range, ... 21.4
Greatest daily range, ... 45.0, July 10
Least daily range, ... 3.5, Nov. 16

Humidity.

Mean dew point, ... 40.1
Mean force of vapor, ...397
Mean relative humidity, ... 75.7

Wind.

Prevailing direction, ... West

Summary.

Northwest, ... 11 per cent.
South, ... 13 " "
North Northwest, ... 9 " "
Other directions, ... 67 " "
Total movement, ... 55,120 m
Greatest daily movement, ... 642 m., Jan. 4
Least daily movement, ... 9 m., Sept. 5
Mean daily movement, ... 151 m
Mean hourly velocity, ... 6.3 m

Maximum pressure per square foot, 27.0 lbs.=73 m. per hour, July 23rd, 5 P., S.S.W.
Maximum velocity for 5 minutes, 48 m. per hour, Jan. 3rd, 3 P., S.W.; Mar. 27th, 9 P., W.

Precipitation. In inches.

Total precipitation, rain or melted snow, . 39.50
Number of days on which .01 or more rain or melted snow fell, ... 135
Snow total in inches, ... 26.5

Weather.

Mean cloudiness observed, ... 50 per cent.
Total cloudiness recorded by Sun Thermometer, ... 2031 hrs.=46 per cent.
Number of clear days, ... 105
Number of fair days, ... 144
Number of cloudy days, ... 116

Bright Sunshine.

Number of hours recorded, 2423 hrs.=54 per cent

Dates of Frosts.

Last, ... May 15th
First, ... Sept. 10th

Dates of Snow.

Last, ... April 9th
First, ... Oct. 31st
Total days of sleighing, ... 23

Gales of 50 or More Miles Per Hour.

Jan. 3d, 60m., S.W.; 4th, 54m., S.W.; 18th, 58m., W.S.W.; Feb. 1st, 52m., W.N.W.; 12th, 50m., W.N.W.; Mar. 20th, 64m, W.N.W.; 31st, 68m, S.W.; Apr. 1st, 58m, W.N.W.; July 23d, 73m, S.S.W.; Oct. 14th, 68m, N.N.E.; Nov. 9th, 53m, S.E. 23d, 54m, N. W.

*Temperature in ground shelter.

E. K. DEXTER,
Observer.

J. E. OSTRANDER,
Meteorologist.

BULLETIN No. 301. JANUARY, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30 22,29th, 3 A.
Minimum reduced to freezing, 28.78,25th, 1 A.
Reduced† maximum reading, 30.53, 29th, 3A.
Reduced† minimum reading, 29.08, 25th, 1 A.
Mean semi-daily reduced, ... 29.957
Monthly range, ... 1.45

*Air Temperature. In Degrees Fahr.

Highest, ... 52.0, 28th, 4P.
Lowest, ... -14.0, 14th, 8A.
Mean hourly, ... 22.2
Mean of means of max. and min., ... 22.4
Mean sensible (wet bulb), ... 19 7
Monthly range, ... 66.0
Highest mean daily, ... 41.4, 30th
Lowest mean daily, ... -7.3, 13th
Mean maximum, ... 31.0
Mean minimum, ... 13.8
Mean daily range, ... 17.2
Greatest daily range, ... 43.0, 23d
Least daily range, ... 4.0, 20th

Humidity.

Mean dew point, ... 15.8
Mean force of vapor, ...129
Mean relative humidity, ... 81.4

Precipitation. In inches.

Total precipitation, ... 3.72
Number of days on which .01 inch or more rain fell, ... 14
Total snow in inches 9.5

*Temperature in ground shelter.
†Reduced to freezing and sea-level.

Wind.

Total movement, ... 5442m.
Greatest daily movement, ... 488m., 13th
Least daily movement, ... 8m., 16th
Mean daily movement, ... 176 m
Mean hourly velocity, ... 7.3 m
Maximum pressure per square foot, 20.0 lbs.= 63m. per hour, 12th, 3P., W.N.W.
Maximum velocity for 5 minutes, 38m. per hour, 12th, 2P., W.N.W.
Prevailing Direction, North Northwest.

Summary.

North	23 per cent
North Northeast	16 " "
South Southwest	10 " "
West	10 " "
Northwest	16 " "
Other directions	25 " "

Weather.

Mean cloudiness observed, ... 63 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 199 hrs.=68 per cent.
Number of clear days, ... 2
Number of fair days, ... 10
Number of cloudy days, ... 19

Bright Sunshine.

Number of hours recorded, . . 95 hrs=32%.
Rain, 4th, 8th, 9th, 10th, 24th, 25th, 29th, 31st.
Snow, 3d, 4th, 7th, 8th, 10th, 12th, 15th, 16th, 17th, 20th, 21st, 26th, 31st.
Sleet, 31st.
Days of Sleighing, 14.
Gales, 35 or more miles per hour: 46m, 10th, W.S.W.; 63m, 12th, W.N.W; 36m, 17th, N.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.27	30.11	30.233	26.0	0 A	9.0	12 P	17.5	17.0	12.3	6.0
2	30.35	30 27	30.305	25.0	12 P	3.0	8 A	14.0	15.1	13.3	0.0
3	30.27	29.86	30.085	32.0	8 P	24.0	9:30 A	28.0	28.3	27.5	0.0
4	29.86	29.73	29.777	35.5	12 P	28.5	8:30 A	32.0	32.4	30 7	0.0
5	30.05	29.77	29.941	38.5	5:30 A	19.0	12 P	28.7	30.6	25.5	0.0
6	30.13	29.84	30.021	32.0	3 P	10.5	8 A	21.3	19.5	14.3	6.6
7	29.84	29.63	29.707	36.5	6:30 P	19.0	0 A	27.7	29.0	27.3	7.0
8	29.68	29.56	29.624	34 0	0 A	29.5	6:30 A	31.7	31.7	29.7	0.0
9	29.57	29.23	29.398	35.0	3 P	29.0	4 A	32.0	32.3	31.5	0 0
10	29.76	29.23	29.477	41.0	8:30 A	21.0	12 P	31.0	30.8	30.0	2.7
11	30.00	29.76	29.957	22 0	3 P	13.5	8 A	17.7	17.0	11.7	7.7
12	29 89	29.45	29.681	29.5	11 A	1.0	12 P	15.3	14.7	11.7	5 3
13	30.27	29.82	30.089	1.0	0 A	−11 5	12 P	−5.3	−7.3	−8.7	7 3
14	30.46	30.27	30.383	10.5	4 P	−14.0	8 A	−1.7	−3.5	−6.5	7.5
15	30.28	29 86	30.007	18.5	8 P	−1.0	0 A	8.7	8.3	9.7	0.0
16	29 87	29 55	29 743	24.5	5 P	5.5	8 A	15.0	17.0	13.7	0.0
17	29.92	29.54	29.729	35.5	2:30 P	22 0	12 P	28.7	27.3	24.0	3.0
18	30.17	29.92	30.159	27.5	3 P	6.0	12 P	16.7	16.3	11.3	8.1
19	30.13	29.64	29.873	30.0	9 P	4.5	7:30 A	17.3	17.8	16.3	3.3
20	29.67	29 61	29.661	29 5	2:30 P	25.5	5:30 A	27.5	27 4	26.3	0.0
21	29 67	29.35	29.476	28 0	0 A	12.0	12 P	20 0	23 0	20.3	2.2
22	30.23	29.67	30.097	26.0	3:30 P	1.5	7:30 A	13.7	12.6	7.3	7.7
23	30.38	29.96	30.211	31.0	12 P	−12 0	7:30 A	9.5	11.3	6.3	5.0
24	29.96	29.12	30.027	44.5	7 P	31.0	0 A	37.7	38.7	38.0	0.0
25	30.30	29 08	29.871	42.0	1 A	8.0	12 P	25.0	23 9	19.3	7.0
26	30.39	30.28	30.338	17.0	4 P	6 5	6 A	11.7	9 8	8.5	0.7
27	30.40	30.07	30.231	35.5	12 P	11.0	0 A	23.3	20.4	21.5	0.0
28	30.46	30.03	30.255	52 0	4 P	33.5	12 P	42.7	38.9	34.5	6.3
29	30.53	30.20	30.380	39.0	12 P	31.0	2 A	35.3	35.3	35.3	0.0
30	30.20	30.01	30.078	48 5	11 A	34.5	12 P	41.5	41.4	37.0	1.3
31	30.21	29.54	29 863	34.5	5 P	28.0	8:30 A	31.3	31.9	30.0	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	10.0	.081	88.0	N.	216	3.0	24	9 A				
2	10.0	.093	85.5	N.	146	1.5	17	1 P				
3	25.5	.157	89.0	N.	218	4.0	28	5 P	1 P	12 P	T	T
4	28.5	.180	87.5	N.N.E.	366	4.5	30	1 A	0 A	10 P	.03	T
5	19.0	.155	71.5	N.N.E.	340	5.0	32	2 P				
6	9.5	.094	76.5	E.N.E.	95	0.0	—	—				
7	23.0	.167	77.5	S.W.	127	0.0	—	—	4 A	5 A	T	T
8	25.5	.178	77.0	S.S.W.	130	0.0	—	—	9 A	9 P	.02	½
9	30.0	.181	95.0	N.N.E.	56	0.0	—	—	4 P	12 P	.02	
10	25.5	.180	76 0	W.	256	10.5	46	3 P	0 A	5 A	.01	T
11	4.5	.084	67.0	N.N.W.	288	2.5	22	6 A				
12	3.5	.089	62.5	S.W.	382	20.0	63	3 P	3 A	6 P	T	T
13	−17.5	.031	60.0	N.W.	488	5 5	33	8 A				
14	−12.0	.037	76 0	N.	167	0.5	10	2 A				
15	5.5	.077	79.5	N.	17	0.0	—	—	10 A	8 P	.07	¾
16	12 0	.091	91.5	N.W.	8	0.0	—	—	7 P	12 P	.09	1
17	21.0	.137	85.0	N.N.E.	217	6.5	36	8 P	0 A	9 A	.06	½
18	5.0	.081	69.5	N.	302	2.5	22	2 A				
19	14.5	.107	89.5	S.S.E.	77	0 0	—	—				
20	23.5	.148	88.5	N.E.	43	0.0	—	—	0 A	12 P	.32	2¼
21	16.5	.117	82.5	N.N.E.	146	2.5	22	11 P	0 A	8 P	.28	2¼
22	4 0	.067	83.0	N.W.	197	3.5	26	1 A				
23	−1.0	.085	67.5	S.S.W.	27	0.0	—	—				
24	36.5	.238	91.5	S.S.W.	230	2.0	20	1 P	8 A	12 P	.75	
25	13.5	.125	71.5	N.N.W.	321	5.0	32	9 A	0 A	5 A	.05	
26	7.0	.069	91.5	N.W.	44	0.0	—	—	10 A	3 P	.16	2
27	20.0	.123	94.5	N.W.	21	0.0	—	—				
28	30.5	.212	82.5	W.	89	0.0	—	—				
29	34.0	.210	93.0	S.S.E.	61	0.0	—	—	2 P	11 P	.06	
30	33.0	.242	80.0	W.	196	3.0	24	6 P				
31	28.0	.173	92.0	N.	171	0.0	—	—	4 A	9 P	1.80	¼

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during January was generally seasonable and showed a number of rapid changes in temperature, which often characterizes this time of year. The changes in atmospheric pressure were also large and comparatively rapid. The amount of cloudiness was unusually large, especially when taken in connection with the precipitation up to the last day of the month. The heavy storm of rain, sleet and snow on the last day of the month furnished practically one-half of the total precipitation record.

Comparing the records of the several weather elements with the normals here shows the following as the principal features. The mean barometer was much less than the normal and the maximum and minimum pressures were both well below the average records for these features. The rapid fall in pressure on the 24th and more rapid rise of more than one inch on the 25th made a very unusual record on the pressure chart. While the wind movement on those dates was large, it at no time became even a moderate gale. The total wind movement was about ten per cent more than the normal, and about one-fourth of the days showed a comparatively large daily movement.

The mean temperature was slightly less than the normal, and the maximum nearly the average value for that feature. The minimum was more than five degrees below its normal value, giving an unusually large range for the month. On the 13th the thermometer was below zero for practically the whole day; the mean hourly temperature being –7.3 degrees. On the following day it also averaged below zero, although considerably above during part of the day.

The mean dewpoint was rather low and the relative humidity considerably above the normal.

The total precipitation was about ten per cent more than the normal, and much the greater part occurred as rain. The snowfall was comparatively small. The sky was cloudy or overcast about two-thirds of the time.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 302. FEBRUARY, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.34,13th, 8 A.
Minimum reduced to freezing, 28.86,14th, 3 P.
Reduced† maximum reading, 30.68, 13th, 8 A.
Reduced† minimum reading, 29.18, 14th, 3 P.
Mean semi-daily reduced, ... 30.132
Monthly range, ... 1.50

***Air Temperature.** In Degrees Fahr.

Highest, ... 46.5, 27th, 4 P.
Lowest, ... -17.5, 16th, 4A.
Mean hourly, ... 17.7
Mean of means of max. and min., ... 17.9
Mean sensible (wet bulb), ... 14 1
Monthly range, ... 64.0
Highest mean daily, ... 36.6, 4th
Lowest mean daily, ... -6.7, 12th
Mean maximum, ... 28.2
Mean minimum, ... 7.7
Mean daily range, ... 20.5
Greatest daily range, ... 45.0, 25th
Least daily range, ... 6.0, 19th

Humidity.

Mean dew point, ... 7.9
Mean force of vapor, ...106
Mean relative humidity, ... 72.0

Precipitation. In inches.

Total precipitation, ... 3.36
Number of days on which .01 inch or more rain fell, ... 8
Total snow in inches 24.5

* Temperature in ground shelter.
† Reduced to freezing and sea-level.

Wind.

Total movement, ... 5855m.
Greatest daily movement, ... 462m., 8th
Least daily movement, ... 43m., 18th
Mean daily movement, ... 209 m
Mean hourly velocity, ... 8.7 m
Maximum pressure per square foot, 12.5 lbs.= 50m. per hour, 14th, 3P., N.N.W.
Maximum velocity for 5 minutes, 39m. per hour, 14th, 3P., N.N.W.
Prevailing Direction, Northwest.

Summary.

North	25 per cent
West Northwest	18 " "
North Northwest	14 " "
North Northeast	11 " "
South Southwest	11 " "
West	11 " "
Other directions	10 " "

Weather.

Mean cloudiness observed, ... 42 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 118 hrs.=40 per cent.
Number of clear days, ... 12
Number of fair days, ... 8
Number of cloudy days, ... 8

Bright Sunshine.

Number of hours recorded, . . 178 hrs=60%.

Rain, 3d, 4th, 7th.

Snow, 3d, 6th, 7th, 13th, 14th, 16th, 17th, 19th, 22d.

Days of Sleighing, 15.

Gales, 35 or more miles per hour: 44m, 7th, W.; 41m, 8th, W.; 50m, 14th, N.N.W.; 35m, 24th, N.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.13	29.56	29.881	40.0	1:30 P	32.0	0 A	36.0	35.7	30 7	5.0
2	30.50	30.13	30.429	38.0	3:30 P	27.0	8 A	32.5	29.3	24.7	8.8
3	30.46	30.13	30.289	45.5	3 P	18.0	7:30 A	31.7	31.3	28.5	1.7
4	30.13	29.92	30.000	43.5	2 P	29.0	12 P	36.3	36 6	32.7	6.0
5	30.33	30.07	30.203	37.5	3 P	23.0	12 P	30.3	28.5	23.5	3.5
6	30.46	29 83	30.256	31.0	12 P	15.0	7 A	23.0	23.5	21.5	0.2
7	29 83	29.30	29.501	34.5	7:30 P	27 0	12 P	30.7	29.4	28.5	1.5
8	30.08	29.65	29 959	27.0	0 A	17.0	12 P	22.0	22.3	18.3	8.2
9	30.33	30.08	30.305	20.0	3 P	9.0	7:30 A	14.5	14.2	9.5	9 3
10	30.26	30.15	30.221	24 0	2:30 P	13.0	12 P	18 5	18.3	15.3	8.3
11	30.35	30.18	30.289	13.0	0 A	-8.0	12 P	2.5	3.7	-2.0	7.9
12	30.62	30 35	30.514	2.5	4 P	-13.0	7:30 A	-5.3	-6.7	-8.7	9.5
13	30.68	30.32	30.571	17.0	10:30 P	-10.0	7:30 A	3.5	3.5	1.0	9.0
14	30.32	29.18	29.645	29.5	4:30 P	10.5	3:30 A	20.0	18.4	16.3	0.0
15	30.07	29.74	30.013	17.5	0 A	-9.0	12 P	4.3	8.0	1.7	9.7
16	30.07	29.68	29.877	11.0	11 P	-17.5	4 A	-3.3	-2.1	-0.7	1.2
17	30.04	29.83	30.007	20.0	3:30 P	-1.5	5 A	9.3	11.1	10.3	8 6
18	30.22	30.02	30.139	26.5	3 P	-7.5	7:30 A	9 5	11.0	8.3	5.5
19	30.02	29 85	29.944	26.5	4:30 P	20 5	6 A	23.5	22.7	22.3	0.3
20	30.20	30.00	30.133	22.5	3 P	12.0	12 P	17.3	17.5	13.5	7.1
21	30.20	30.06	30.190	31.0	3:30 P	7.5	7 A	19.3	13.2	7.3	8.5
22	30.19	29 80	29.986	31.0	4 P	-1.5	3:30 A	14 7	17 5	17.5	1.5
23	30.27	30.02	30.248	19.0	3 P	3.0	12 P	11.0	11.6	6.0	8.0
24	30.45	30.24	30.391	15.5	4 P	-3.0	7 A	6.3	3 5	-1.3	10.1
25	30.52	30.30	30.435	32.5	3:30 P	-12.5	7 A	10 0	8 5	4.3	10.1
26	30.30	30.11	30 195	40 5	4 P	--0 5	7 A	20.0	20.2	13.5	9.9
27	30 11	30.04	30.099	46.5	4 P	23.5	6:30 A	35.0	33.3	27.0	10 0
28	30.11	29.80	29.977	46 0	3 P	12.5	7 A	29.3	31.1	25.7	8 5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	21.5	.203	59.0	W.N.W.	316	5.5	33	1 P				
2	18.5	.143	71.5	N.N.W.	247	2.5	22	2 A				
3	25.0	.180	83.0	E.	70	0.0	—	—	12 M	12 P	.08	T
4	28.5	.201	80.0	W.N.W.	146	2.0	20	2 P	0 A	6 A	.02	
5	15.0	.145	62.5	N.	136	0.5	10	9 A				
6	18.5	.127	86.0	N.N.E.	157	1.0	14	9 A	4 P	12 P	.20	1¼
7	25.0	.170	82.5	N.	140	9.5	44	10 P	0 A	3 P	.31	¼
8	14.0	.109	76 0	W.	462	8 5	41	5 A				
9	−1.0	.077	56.5	W.	324	2.0	20	3 A				
10	5.0	.101	58.5	W.N.W.	268	1.5	17	1 P				
11	−12.0	.045	57.0	N.N.W.	287	3 5	26	7 P				
12	−18 0	.031	59.0	N.W.	332	4.0	28	3 P				
13	−2.5	.056	80.0	N.N.W.	141	0.0	—	—	10 P	12 P	.06	⅜
14	11.5	.099	81.0	N.	365	12.5	50	3 P	0 A	6 P	1.95	15¾
15	−1.0	.052	83.5	N.	311	5.0	32	1 A				
16	−5.0	.049	80.0	N.N.W.	133	2.0	20	11 P	12 M	8 P	.24	1
17	6.0	.076	80.5	W.N.W.	209	3.0	24	1 P	7 P		T	T
18	3.5	.081	76.5	W.	43	0.0	—	—				
19	20.5	.123	93.5	N.	102	0.0	—	—	1 A	9 P	.50	5½
20	9 0	.087	77.5	N.	233	1.5	17	7 P				
21	−3.5	.070	54.5	N.N.E.	174	2.0	20	4 A				
22	13.5	.107	79.0	S.S.W.	271	4.0	28	9 P	2 P		T	T
23	−6.5	.066	52.5	N.N.E.	299	4.5	30	10 P				
24	−8.0	.043	70.0	N.	390	6.0	35	4 A				
25	−3.5	.065	64.0	W.N.W.	57	0.0	—	—				
26	7.5	.102	73.5	S.S.W.	65	0.0	—	—				
27	21.5	.173	69.0	S.S.W.	86	0.0	—	—				
28	19 5	.175	69.5	S.	91	0.5	10	5 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during February was marked by much more than the usual amount of extreme cold—the temperature going below zero on eleven days—and large fluctuations in the barometer's records. The interval between the maximum and minimum barometer for the month was only about thirty hours, and the fall of more than one inch in twelve hours on the 14th showed a change in pressure seldom equalled for rapidity here. Accompanying this change in pressure was one of the most severe snow-storms of recent years. The first week of the month was much more nearly normal than any other part.

The records of the several weather elements show the following as the more important features: The mean barometer was nearly a tenth of an inch higher than the normal and the fluctuations in pressure were generally large. The maximum, minimum and range of pressure were practically normal. The total wind movement was about a thousand miles more than usual—more than one-third of the days showing a large daily movement. Nearly three-fourths of the wind was from the northerly points of the compass.

The mean temperature was nearly seven degrees below the normal, making it one of the coldest months since this station was established. Owing to the low minimum of the month the range was considerably larger than usual. On the 12th and 16th the mean hourly temperature was below zero.

The total precipitation was slightly more than the normal; more than two inches resulting from the severe snow-storm of the 13th-14th. Nearly all of the precipitation was in the form of snow.

The mean dew point was extremely low and the relative humidity was much lower than usual. The amount of sunshine was considerably more than the normal. Sleighing began on the 14th and continued throughout the remainder of the month.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 303. MARCH, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.26, 25th, 9 A.
Minimum reduced to freezing,	28.17, 1st, 8 P.
Reduced† maximum reading,	30.57, 25th, 9 A.
Reduced† minimum reading,	28.47, 1st, 8 P.
Mean semi-daily reduced,	29.997
Monthly range,	2.10

***Air Temperature.** In Degrees Fahr.

Highest,	69.0, 27th, 3 P.
Lowest,	8.5, 21st, 5:30 A.
Mean hourly,	32.7
Mean of means of max. and min.,	33.7
Mean sensible (wet bulb),	29.6
Monthly range,	60.5
Highest mean daily,	53.9, 27th
Lowest mean daily,	18.8, 20th
Mean maximum,	41.9
Mean minimum,	25.5
Mean daily range,	16.4
Greatest daily range,	26.5, 16th, 25th
Least daily range,	4.0, 6th

Humidity.

Mean dew point,	24.8
Mean force of vapor,	185
Mean relative humidity,	76.4

Precipitation. In inches.

Total precipitation,	5.52
Number of days on which .01 inch or more rain fell	11
Total snow in inches	6.25

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	5663m.
Greatest daily movement,	438m., 19th
Least daily movement,	44m., 22d
Mean daily movement,	183 m
Mean hourly velocity,	7.6 m

Maximum pressure per square foot, 30.0 lbs.= 77m. per hour, 1st, 6P., E.

Maximum velocity for 5 minutes, 45m. per hour, 1st, 6P., E.

Prevailing Direction, Northwest.

Summary.

North Northwest	16 per cent
West Northwest	13 " "
North	13 " "
North Northeast	10 " "
Southwest	10 " "
Other directions	38 " "

Weather.

Mean cloudiness observed,	53 per cent.
Total cloudiness recorded by the Sun Thermometer,	201 hrs.=54 per cent.
Number of clear days,	4
Number of fair days,	15
Number of cloudy days,	12

Bright Sunshine.

Number of hours recorded, . . 170 hrs=46%.

Rain, 1st, 2d, 3d, 4th, 6th, 7th, 8th, 17th, 18th, 26th, 27th, 28th, 29th, 30th.

Snow, 1st, 2d, 4th, 6th, 7th, 9th, 18th, 22d, 23d, 28th, 29th.

Hail, 18th, 28th.

Gales, 35 or more miles per hour: 77m, 1st, E.; 37m, 3d, N.N.W.; 52m, 19th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.80	28.47	28.969	45.5	7 P	28.5	4:30 A	37.0	36.2	37.3	0.0
2	29.25	28.60	29.110	40.5	4 P	32.5	7 A	36.5	35.7	33.3	0.2
3	29.57	29.25	29.413	46.0	1 P	32.0	1 A	39.0	38.4	35.0	3.3
4	29.90	29.57	29.749	38.0	12 M	28.5	7 A	33.3	33.4	29.0	0.9
5	30.07	29.90	30.042	44.5	4:30 P	28.0	7:30 A	36.3	33.5	27.7	8.7
6	30.06	29.73	29.883	34.0	9 A	30.0	12 P	32.0	32.0	30.3	0.0
7	29.74	29.60	29.672	37.5	2:30 P	28.5	7 A	33.0	32.5	30.5	3.9
8	29.78	29.66	29.712	37.5	0:30 P	27.5	12 P	32.5	32.7	29.5	1.6
9	29.91	29.77	29.829	31.5	2 P	21.0	12 P	26.3	26.3	22.7	5.0
10	30.12	29.91	30.058	32.5	4 P	18.0	7:30 A	25.3	23.9	20.5	9.6
11	30.14	30.03	30.134	34.0	4:30 P	16.0	6 A	25.0	24.7	22.0	10.0
12	30.24	30.07	30.163	35.5	3 P	11.5	7 A	23.5	23.6	19.5	10.2
13	30.27	30.05	30.163	37.5	3:30 P	13.5	7 A	25.5	24.7	20.5	8.8
14	30.33	30.05	30.196	41.0	3 P	16.5	6:30 A	28.7	30.4	28.5	6.5
15	30.19	30.01	30.087	53.0	3:30 P	32.0	12 P	42.5	39.6	33.0	6.5
16	30.18	30.05	30.129	55.0	3:30 P	28.5	7 A	41.7	40.4	36.7	8.8
17	30.05	29.90	29.990	53.0	4 P	31.0	12 P	42.0	38.3	35.0	6.1
18	29.90	29.42	29.648	35.5	8 A	30.5	2 A	33.0	32.5	33.0	0.0
19	30.06	29.54	29.922	33.5	0 A	20.0	12 P	26.7	26.6	22.0	8.3
20	30.36	30.01	30.173	27.5	2:30 P	13.0	12 P	20.3	18.8	14.5	7.5
21	30.45	30.26	30.383	33.5	2:30 P	8.5	5:30 A	21.0	20.7	18.0	9.5
22	30.26	29.86	29.993	35.5	4 P	21.5	6 A	28.5	25.8	22.7	5.5
23	30.10	29.89	30.018	39.0	1:30 P	20.5	3:30 A	29.7	28.8	25.7	4.2
24	30.45	30.10	30.330	43.5	3:30 P	22.0	5 A	32.7	31.2	26.3	9.2
25	30.57	30.43	30.561	49.0	3 P	22.5	6:30 A	35.7	35.8	30.7	8.7
26	30.43	30.21	30.300	62.5	3:30 P	37.5	1:30 A	50.0	48.5	46.3	7.8
27	30.21	30.05	30.125	69.0	3 P	45.0	2 A	57.0	53.9	52.3	7.4
28	30.36	30.13	30.289	46.0	0 A	33.0	9:30 P	39.5	37.0	35.7	0.0
29	30.42	30.33	30.397	37.5	4 P	32.0	12 P	34.7	34.5	32.3	0.0
30	30.33	29.97	30.079	35.0	0:30 P	30.0	6 A	32.5	32.4	32.0	0.0
31	30.45	30.05	30.401	54.5	5 P	32.0	0 A	43.3	41.3	35.7	11.4

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	35.5	.239	89.5	N.N.E.	279	30.0	77	6 P	1 A	11 P	2.59	2¼
2	29.5	.205	81.5	N.E.	264	2.5	22	5 A	8 A	4 P	T	T
3	29.0	.234	70.5	N.N.W.	331	7.0	37	12 M	3 A	5 A	.02	
4	22.5	.184	66.0	W.N.W.	170	2.0	20	1 A	2 P		T	T
5	21.5	.171	68.5	N.N.W.	181	0.5	10	7 A				
6	26.5	.183	78 0	N.N.E.	185	2.5	22	7 P	9 A	12 P	.19	¾
7	28 0	.177	90.0	S.W.	120	0.5	10	7 P	0 A	12 P	.11	¾
8	25.0	.177	77.0	W.S.W.	172	0.0	—	—	0 A	3 A	T	
9	17.0	.137	72.5	W.N.W.	206	3 5	26	3 P	8 A		T	T
10	12.5	.125	67.5	N.W.	251	3.0	24	6 P				
11	14.0	.136	63.0	N.N.W.	147	1.0	14	2 P				
12	9.5	.126	55.0	N.N.W.	98	0.5	10	4 A				
13	15 5	.125	75.5	N.N.W.	66	1.0	14	8 P				
14	21.5	.173	69.5	S.	232	4.0	28	6 P				
15	28.0	.211	73.0	W.	192	1.0	14	3 A				
16	34.5	.235	86 5	S.S.E.	109	0.0	—	—				
17	32.0	.220	82.5	N.	79	1.5	17	4 P	5 A	10 A	.16	
18	30.5	.197	88.0	N.	115	0.0	—	—	7 A	6 P	.67	2¼
19	16.0	.131	71.5	W.N.W.	438	13.5	52	7 A				
20	6.5	.095	64.0	N.W.	308	4.0	28	4 P				
21	7.5	.116	57.5	W.N.W.	130	1.0	14	1 A				
22	16.5	.136	69.0	W.	44	0.0	—	—	10 A		T	T
23	21.5	.150	80.0	S.W.	131	0.5	10	4 P	2 P	4 P	T	T
24	22.5	.160	75.5	S.S.W.	60	0.0	—	—				
25	26.5	.194	76.0	S.S.W.	133	0.5	10	7 P				
26	45 0	.332	91.0	S.	249	0.0	—	—	0 A	6 A	.12	
27	50.5	.415	90.5	S.W.	167	2.0	20	10 P	3 A	12 P	.40	
28	34.0	.175	93 5	N.N.E.	200	1.0	14	11 A	0 A	12 P	1.21	¼
29	29.5	.152	85 5	N.E.	248	2.0	20	9 A	0 A	12 P	.02	T
30	30 0	.187	92 5	N.	149	0.0	—	—	0 A	11 P	.03	
31	29.5	.243	69.0	N.	209	3.0	24	3 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The first day of the month was marked by an unusually rapid fall of the barometer, accompanied by an extremely heavy rainstorm and excessive wind velocity. The barometer fell from 29.50 at 0 A. M. to 28.17 at 8 P. M., and the record passed entirely off the chart and unsealed the mercury column and put the self-recording barometer out of commission. At 6 P. M. the pressure chart showed a velocity of wind of 77 miles per hour, and the anemometer showed 45 miles per hour for a considerable time. The Draper barometer was broken as a result of the storm, and the maximum and minimum pressures for the first 18 days of the month were taken from barograph records taken by Professor Todd, and reduced by comparing them with our standard barometer readings in the tower. The minimum barometer reading on the 1st reduced to freezing and sea level was 28.47—the lowest record since the station was established 25 years ago. A large precipitation and much cloudiness were the most noticeable features of the weather for the month.

A comparison of the records of the several weather elements with the normals for this station shows the following features of interest: The mean barometer was slightly below the normal and the range exceeded the normal range for a whole year. The maximum pressure was slightly lower than the average value of this feature for March. The total wind movement was practically normal, with much from the Northwest quadrant.

The mean temperature was slightly below the normal value and the range greater than usual, owing to a rather high maximum for the month.

The mean dew point was slightly lower than the normal and the mean relative humidity about two points higher than usual.

The total precipitation was about one and one-half inches more than the normal, and several heavy rains were noted. Rains near the last of the month took much of the frost from the ground, and the roads have begun to dry in places. The season's progress at the close of the month was between one and two weeks behind normal conditions.

J. E. OSTRANDER, Meteorologist

E. K. DEXTER, Observer.

BULLETIN No. 304. APRIL, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30 12, 1st,	0 A.
Minimum reduced to freezing,	29.06, 2d,	6 A.
Reduced† maximum reading,	30.43, 1st,	0 A.
Reduced† minimum reading,	29.37, 2d,	6 A.
Mean semi-daily reduced,	30.031	
Monthly range,	1.06	

***Air Temperature.** In Degrees Fahr.

Highest,	83.5, 19th, 2:30 P.	
Lowest,	22.0, 4th, 6 A.	
Mean hourly,	42.1	
Mean of means of max. and min.,	42.6	
Mean sensible (wet bulb),	38.1	
Monthly range,	61.5	
Highest mean daily,	63.2, 19th	
Lowest mean daily,	31.9, 4th	
Mean maximum,	52.5	
Mean minimum,	32.8	
Mean daily range,	19.7	
Greatest daily range,	41.0, 18th	
Least daily range,	3.0, 16th	

Humidity.

Mean dew point,	33.3
Mean force of vapor,	.269
Mean relative humidity,	75.5

Precipitation. In inches.

Total precipitation,	6.59
Number of days on which .01 inch or more rain fell	16
Total snow in inches	5.25

*Temperature in ground shelter.

†Reduced to freezing and sea-level.

Wind.

Total movement,	6194m.
Greatest daily movement,	401m., 11th
Least daily movement,	58m., 8th
Mean daily movement,	207 m
Mean hourly velocity,	8.6 m
Maximum pressure per square foot, 26.5 lbs.= 73m. per hour, 12th, 6P., W.	
Maximum velocity for 5 minutes, 45m. per hour, 12th, 5P., W.	
Prevailing Direction, Northwest.	

Summary.

North	13 per cent.
North Northeast	13 " "
Northwest	13 " "
South	10 " "
West Southwest	10 " "
North Northwest	10 " "
Other directions	31 " "

Weather.

Mean cloudiness observed,	56 per cent.
Total cloudiness recorded by the Sun Thermometer,	208 hrs.=52 per cent.
Number of clear days,	12
Number of fair days,	5
Number of cloudy days,	13

Bright Sunshine.

Number of hours recorded, . . 194 hrs=48%.

Rain, 1st, 2d, 3d, 5th, 7th, 8th, 9th, 11th, 12th, 15th, 16th, 19th, 20th, 22d, 25th, 26th, 27th, 28th, 29th, 30th.

Hail, 15th, 16th.

Snow, 3d, 5th, 7th, 15th, 16th.

Frosts after the 15th---18th, 24th.

Gales, 35 or more miles per hour: 51m, 11th, S.; 73m, 12th, W.; 35m, 13th, N.W.; 35m, 15th, E.N.E.; 36m, 17th, N.; 38m, 19th, S.S.W.; 39m, 20th, N.; 39m, 21st, N.N.W.; 43m, 22d, W.N.W.; 36m, 23d, N.N.W.; 36m, 30th, N.N.E.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.43	29.50	30.057	47.5	11 A	25.5	6 A	36.5	37.2	34.3	4.3
2	29.74	29.37	29.563	45.0	8:30 A	33.5	12 P	39.3	39.0	37.3	4.8
3	30.11	29.72	29 893	40.0	4 P	26.5	12 P	33.3	33.4	29.3	10.3
4	30.20	30.11	30.178	41.5	5 P	22.0	6 A	31.7	31.9	29.7	11.2
5	30.19	30.07	30.135	43.0	5:30 P	30.0	12 P	36.5	34.7	31.3	3.3
6	30.23	30.06	30.180	46.5	3 P	24.0	6 A	35.3	35.1	30.3	9.7
7	30.15	30.01	30.073	36.0	0 A	32.0	7:30 A	34.0	34.1	32.7	0.0
8	30.01	29.58	29.715	56.0	9 P	33.0	3 A	44.5	39.6	44.3	0.0
9	29.94	29 63	29.817	45.0	0 A	29.0	12 P	37.0	36.7	32.0	8.1
10	30.15	29.94	30.075	49.5	4 P	28.5	5 A	39.0	37 9	33.3	11.8
11	30.15	29.88	30.022	53.0	1:30 P	31.5	4 A	42.3	41.0	38.7	10.6
12	30.04	29.65	29.939	59.5	12:30 P	31.0	12 P	45.3	42.7	35.3	10.9
13	30.31	30.04	30.273	43.5	5 P	25.0	6 A	34.3	33.0	27.7	12.3
14	30.33	30.11	30.247	60.5	2:30 P	23.0	6 A	41.7	40.9	33.5	11.2
15	30.23	29.94	30.151	48.0	2P	32.5	4:30 A	40.3	39 0	34.3	7.1
16	29.94	29.68	29.723	35.0	3:30 A	32.0	12 P	33.5	33.7	32.0	0.0
17	30.13	29.74	29.952	60.0	3:30 P	26 5	4:30 A	42.7	44 6	39.2	11.3
18	30.19	29.98	30.111	71.5	4 P	30.5	5:30 A	51.0	52.1	44.7	11.5
19	29.98	29.65	29.802	83.5	2:30 P	48.0	5:30 A	65.7	63.2	54.3	7.3
20	29.74	29.55	29.641	60.0	11 A	46.0	12 P	53.0	55.0	51.5	0.5
21	30.13	29.65	30.006	50.5	4:30 P	37.5	11:30 P	44.0	43.9	40.5	11.1
22	30.13	29.85	30.031	65.0	3:30 P	38.5	0 A	51.7	49.6	43.3	8.0
23	30.35	30.13	30.307	52.5	5 P	32.5	12 P	42.5	42.3	35.0	12.3
24	30.36	30.20	30.307	61.5	5 P	29.0	2 A	45.3	46.4	40.0	12.2
25	30.39	30.28	30 373	55.0	2:30 P	39.5	6 A	47.3	45.0	37.7	1.1
26	30.31	29.95	30.069	42.0	6 P	34 5	1:30 A	38 3	38 4	38.5	0.0
27	30.20	29 94	30.094	53.0	4 P	40.0	2 A	46.5	46.9	45.7	0.0
28	30.21	30.02	30.135	62 0	1:30 P	46.5	4 A	54.3	54.3	52.3	0.0
29	30.04	29.95	30.013	55 0	0 A	40.0	12 P	47 5	48.5	46.7	0.0
30	30.09	29.99	30.053	52.5	5 P	36.0	12 P	44.3	42.6	38 7	3.1

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	31.0	.211	83.0	W.	77	0.5	10	12 M	1 P	12 P	.54	
2	27.5	.249	69.5	N.W.	183	2.0	20	4 P	0 A	12 P	.22	
3	23.5	.181	69.0	N.N.W.	202	3.0	24	9 P	0 A	5 A	.03	¼
4	27.5	.186	78.5	W.N.W.	156	1.5	17	2 P				
5	22.5	.195	67.5	W.	215	2.5	22	2 P	9 A		T	T
6	23.0	.203	63.5	W.N.W.	95	0.5	10	2 A				
7	31.0	.190	95.0	N.W.	77	0.0	—	—	1 A	12 P	.83	1¾
8	43.0	.313	96.0	N.	58	5.5	33	11 P	0 A	12 P	.99	
9	26.5	.203	72 0	N.N.W.	320	3.0	24	8 P	0 A	4 A	.25	
10	27.0	.219	67.0	N.W.	241	2.5	22	12 M				
11	34.5	.264	76.5	S.	401	13.0	51	1 P	10 P	12 P	.01	
12	27.0	.249	59.0	W.S.W.	344	26.5	73	6 P	0 A	5 P	.02	
13	20.0	.177	62.5	N.W.	280	6.0	35	1 P				
14	25.5	.237	61.0	S.	163	5.0	32	6 P				
15	27.5	.332	69.0	E.N.E.	242	6.0	35	6 P	5 P	12 P	.28	¼
16	29.5	.188	90.0	N.N.E.	244	3.5	26	10 A	0 A	10 P	.99	3
17	34.0	.291	69.0	N.	151	6.5	36	4 P				
18	40.0	.367	69.0	S.W.	124	3.0	24	8 P				
19	50.0	.502	75.0	S.	266	7.0	38	5 P	7 A		T	
20	50.0	.403	91.0	S.S.W.	197	7.5	39	10 P	2 A	11 P	.96	
21	39.0	.265	88.0	N.N.W.	286	7.5	39	12 M				
22	39.5	.319	77.5	W.S.W.	252	9.0	43	6 P	3 A		T	
23	25.0	.255	53.0	N.	349	6.5	36	1 A				
24	29.5	.327	50.5	N.	182	5.0	32	1 P				
25	31.0	.269	66.0	S.E.	180	4.0	28	12 M	8 P	12 P	.28	
26	37.5	.239	93.5	N.N.E.	143	2.5	22	9 P	0 A	12 P	.79	
27	44.5	.321	91.0	N.N.E.	294	4.5	30	12 M	0 A	12 P	.15	
28	50.5	.413	92.0	W.SW.	159	3.0	24	6 P	0 A	12 P	T	
29	45.5	.343	91.5	E.	131	1.5	17	11 A	0 A	12 P	.07	
30	35.0	.265	79.5	N.N.E.	182	6.5	36	6 P	0 A	1 P	.18	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

During the month the season made less than normal progress, and at the close of the month vegetation had hardly more than made a start. The first half the month was especially cold and but a single day during that time showed a mean temperature higher than the average for the month. The last week of the month was also colder than usual, with rain nearly every day of that time. The mean temperature placed the month with the unusually cold Aprils of the last quarter of a century.

The precipitation was more than twice the normal amount and was well distributed throughout the month. The snowfall nearly equalled that of the preceding month.

The following were the more important characteristics of the records of the several weather elements: The mean barometer was higher than the normal and the range slightly less than usual. The maximum and minimum pressures were but 30 hours apart. The total wind movement was unusually large and numerous gales were recorded. On twelve days the average daily velocity exceeded ten miles per hour.

The mean temperature was more than four degrees below the normal and the range was exceptionally large. The minimum temperature for the month was very nearly equal to the April average for that feature.

The mean dew point was considerably lower than the normal, owing to the low temperatnre of the month. The mean relative humidity was very high, due to the large number of rainy days.

The total precipitation, as previously noted, was exceptionally large, in fact, it was higher than any previous April record since this station was established.

The amount of cloudiness was much more than normal, owing to the large amount of rainy weather.

J. E. OSTRANDER, Meteorologist.

E. K. DEXTER, Observer.

BULLETIN No. 305. MAY, 1914

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30 20, 18th, 9 A.
Minimum reduced to freezing,	29.19, 6th, 4 A.
Reduced† maximum reading,	30.50, 18th, 9 A.
Reduced† minimum reading,	29.49, 6th, 4 A.
Mean semi-daily reduced,	30.043
Monthly range,	1.01

***Air Temperature.** In Degrees Fahr.

Highest,	91.0, 27th, 2 P.
Lowest,	27.0, 2d, 5 A.
Mean hourly,	59.0
Mean of means of max. and min.,	58.9
Mean sensible (wet bulb),	57.5
Monthly range,	64.0
Highest mean daily,	75.9, 27th
Lowest mean daily,	40.3, 13th
Mean maximum,	72.3
Mean minimum,	45.5
Mean daily range,	26.7
Greatest daily range,	39.0, 3d, 18th
Least daily range,	6.0, 13th

Humidity.

Mean dew point,	49.3
Mean force of vapor,	.522
Mean relative humidity,	74.5

Precipitation. In inches.

Total precipitation,	3.56
Number of days on which .01 inch or more rainfall	11

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	4491m.
Greatest daily movement,	364m., 6th
Least daily movement,	42m., 18th
Mean daily movement,	145 m
Mean hourly velocity,	6.0 m

Maximum pressure per square foot, 19.0 lbs.= 62m. per hour, 27th, 5P., W.

Maximum velocity for 5 minutes, 30m. per hour, 27th, 5P., W.

Prevailing Direction, West Northwest.

Summary.

North Northwest	26 per cent.
Northeast	13 " "
West	13 " "
West Northwest	10 " "
Northwest	10 " "
Other directions	28 " "

Weather.

Mean cloudiness observed,	42 per cent.
Total cloudiness recorded by the Sun Thermometer,	129 hrs.=28 per cent.
Number of clear days,	15
Number of fair days,	12
Number of cloudy days,	4

Bright Sunshine.

Number of hours recorded, . . 324 hrs=72%.

Rain, 4th, 5th, 6th, 8th, 9th, 11th, 12th, 13th, 14th, 17th, 25th, 26th, 27th, 30th.

Frosts, 1st, 2d, 16th.

Thunder and Lightning, 4th, 9th, 12th, 26th, 27th.

Gales, 35 or more miles per hour: 37m, 1st, N.W.; 40m, 2d, N.N.W.; 40m, 6th, N.N.W.; 54m, 23d, N.W.; 38m, 25th, S.S.W.; 62m, 27th, W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.10	29.85	29.967	54.5	3 P	32.0	2:30 A	43.3	42.4	37.3	12.7
2	29.98	29.79	29 891	65.0	3:30 P	27.0	5 A	46.0	48.5	43.5	12.3
3	30.09	29.98	30.061	74.5	4 P	35.5	5:30 A	55.0	56.2	50.5	12.0
4	30.07	29.85	29.988	69.5	11:30 A	42.5	5:30 A	56.0	56.6	49.3	7 9
5	29.89	29.52	29 655	55.0	2 P	48 5	12 P	51.7	51.4	49.7	0.0
6	29.78	29.49	29.641	69.5	3:30 P	48.5	0 A	59 0	57.7	53.3	10.7
7	29.88	29.78	29.847	74.0	5 P	38 5	5 A	56.3	56.8	51.5	10 5
8	29.89	29.73	29.816	66.5	12:30 P	47.5	5:30 A	57.0	56.5	51.0	4 4
9	29.77	29.59	29.708	74 5	4 P	50.5	5 A	62.5	60.8	55.3	11.4
10	29.89	29 75	29.819	74.5	2:30 P	44.0	5:30 A	59.3	61.6	56.5	11.2
11	30.04	29.89	29 981	72.5	4 P	50.5	5 A	61.5	62.7	59 0	10.7
12	30.20	30.03	30.121	57.0	0 A	39 0	12 P	48.0	45 6	41.3	0.0
13	30.20	30.10	30.160	43 5	5 P	37.5	6 A	40.5	40.3	39.0	0 0
14	30.13	30.00	30.077	66.0	5 P	40.5	3 A	53.3	51.3	46.5	10 5
15	30.19	30.06	30.125	64.5	3:30 P	40.5	4:30 A	52.5	53.2	47.7	13.2
16	30.25	30.13	30.199	69 0	5 P	35.0	5 A	52.0	54.1	48.7	13.5
17	30.40	30.25	30.350	72.5	4:30 P	40.0	5:30 A	56 3	56.5	46 5	11.4
18	30.50	30.40	30 455	78.5	3:30 P	39 5	4:30 A	59.0	60.5	52.5	13.1
19	30.49	30.34	30.419	82.0	3:30 P	46.5	6 A	64.3	65 4	54.7	13.0
20	30.36	30.20	30.279	84 0	5 P	47.5	5:30 A	65.7	66 9	59.0	12.9
21	30.20	30.03	30.103	76.0	1 P	52.0	5:30 A	64 0	63 0	56.0	11.1
22	30.03	29.70	29.839	82.5	4 P	48.5	5:30 A	65.5	64 5	60.0	12.1
23	30 00	29.69	29.822	68.5	10 A	49 0	12 P	58.7	60.0	57.5	12.0
24	30.32	30.00	30 229	73.0	1:30 P	44.0	3:30 A	58.5	60.0	55.5	13.0
25	30.34	30.15	30 261	75.0	12 M	53.5	0 A	64.3	64.6	62.7	6.8
26	30.15	29 93	30.043	90.0	3 P	63 5	4 A	76.7	73.7	67.0	10.0
27	30.04	29 93	29.973	91.0	2 P	65.5	11:30 P	78.3	75.9	70.3	11.6
28	30.29	29.91	30.081	85.0	4 P	61.0	12 P	73.0	73.1	63.7	14.2
29	30.43	30.28	30.377	75 0	4:30 P	49.0	12 P	62.0	61.7	54.0	14.2
30	30.32	29.94	30.066	77.5	5 P	45.0	3 A	61.3	61.5	58.0	13.2
31	30.06	29.88	29 967	80.0	4 P	50.0	5 A	65.0	67.0	58.5	14.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	29.0	.266	63.0	N.N.W.	269	7.0	37	10 A				
2	36.0	.367	60.5	N.N.W.	219	8.0	40	10 A				
3	45 0	.455	65.5	N.W.	91	1.5	17	2 P				
4	45.5	.410	75.5	S.	142	5.5	33	2 P	6 P	12 P	.33	
5	48.5	.371	93.5	E.N.E.	114	1.5	17	12 P	0 A	12 P	1.01	
6	49.5	.478	75.0	N.N.W.	364	8.0	40	2 P	0 A	4 A	.05	
7	48.0	.460	74.5	W.	57	0.5	10	3 P				
8	48.0	.422	80.0	N.E.	108	2.5	22	9 P	5 P	12 P	.04	
9	53.0	.495	82.0	W.N.W.	116	2.0	20	3 P	6 P	10 P	.17	
10	52.0	.559	70.0	N.N.W.	154	4.5	30	6 P				
11	55.5	.605	72.0	W.N.W.	171	3 0	24	11 A	6 P	12 P	.14	
12	39.0	.280	86.5	N.E.	144	2.0	20	2 P	0 A	12 P	1 .03	
13	37.0	.249	90.0	N.E.	155	1.0	14	7 A	0 A	12 P	.65	
14	43.0	.372	77.0	W.S.W.	93	2.0	20	1 P	0 A	7 A	T	
15	40 5	.417	62.5	N.N.W.	169	4.5	30	2 P				
16	42.5	.437	63 5	W.NW.	130	4.0	28	3 P				
17	40.0	.397	62.5	N.N.W.	77	2.5	22	7 P	6:30 P		T	
18	47.0	.500	66.5	N.N.W.	42	6.5	10	6 P				
19	49.5	.565	64.0	E.	65	1.0	14	2 P				
20	55.5	.615	72.0	N.W.	48	0.0	—	—				
21	52.5	.536	73 5	N.E.	66	0.5	10	11 P				
22	58.5	.570	87.5	S.S.E.	64	1.0	14	10 P				
23	50.0	.540	82.0	N.W.	281	14.5	54	2 P				
24	53 0	.493	83.0	W.	129	1.0	14	4 P				
25	61.0	.623	87.5	S.S.W.	238	7.0	38	4 P	5 A	12 P	.05	
26	65.5	.749	85.0	W.S.W.	180	5.0	32	6 P	0 A	5 P	.01	
27	68.0	.861	81.0	W.	134	19.0	62	5 P	5 P	6 P	.08	
28	58.5	.765	66.0	N.N.W.	199	5.0	32	2 P				
29	49.5	.515	69.0	S.	151	5.0	32	6 P				
30	55.0	.573	77.5	S.W.	192	1.5	17	12 M	8 A	1 P	T	
31	52 5	.656	60.5	W.	129	3.0	24	2 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during May was more nearly normal than that of the preceding month, and the seasonal progress was rapid. Most of the precipitation occurred during the first half of the month, and the last half of the month was marked by generally clear weather with a few exceptionally warm days. Normal conditions were the rule the last part of the month.

An analysis of the records of the several weather elements shows the following features: The mean barometer was considerably higher than the normal and the range large for the time of year. Several rather high barometer records were made, while the minimum was about the usual value.

The mean temperature was about two and a half degrees above the May normal, and the maximum was the highest since 1900. The minimum was three degrees lower than the normal for this feature, but occurred so early in the month that no damage was done, although traces of ice were noted in a few places. Owing to the abnormal maximum and minimum records the range was exceptionally large for the month.

The mean dew point and relative humidity were both considerably higher than the normals for these features.

The precipitation was slightly less than the usual amount, and the number of days having a measurable amount, comparatively few.

The total wind movement was slightly less than the normal, and an exceptionally large percentage of the total was from the northwest quadrant.

The amount of bright sunshine was a hundred hours more than the normal for this month.

J. E. OSTRANDER, Meteorologist.

E. K. DEXTER, Observer.

BULLETIN No. 306. JUNE, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29 99, 9th, 8 A.
Minimum reduced to freezing,	29.34, 20th, 11 P.
Reduced† maximum reading,	30.29, 9th, 8 A.
Reduced† minimum reading,	29.64, 20th, 11 P.
Mean semi-daily reduced,	29.952
Monthly range,	0.65

***Air Temperature.** In Degrees Fahr.

Highest,	90.5, 24th, 3 P.
Lowest,	39.0, 6th, 5-30 A.
Mean hourly,	64.4
Mean of means of max. and min.,	64.6
Mean sensible (wet bulb),	59 2
Monthly range,	51.5
Highest mean daily,	79.4, 26th
Lowest mean daily,	56.5, 16th
Mean maximum,	76.3
Mean minimum,	52.8
Mean daily range,	23'5
Greatest daily range,	40.5, 7th
Least daily range,	5.5, 28th

Humidity.

Mean dew point,	55.7
Mean force of vapor,	.609
Mean relative humidity,	76.1

Precipitation. In inches.

Total precipitation,	2.32
Number of days on which .01 inch or more rainfell	8

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	4468m.
Greatest daily movement,	312m., 20th
Least daily movement,	47m., 29th
Mean daily movement,	149 m
Mean hourly velocity,	6.2 m

Maximum pressure per square foot, 14.0 lbs.= 53m. per hour, 15th, 6 P., S.

Maximum velocity for 5 minutes, 24m. per hour, 16th, 3P., N.W.

Prevailing Direction, West.

Summary.

North Northwest	13 per cent.
North Northeast	10 " "
West Northwest	17 " "
South	20 " "
Other directions	40 " "

Weather.

Mean cloudiness observed,	48 per cent.
Total cloudiness recorded by the Sun Thermometer,	174 hrs.=38 per cent.
Number of clear days,	12
Number of fair days,	11
Number of cloudy days,	7

Bright Sunshine.

Number of hours recorded, 283 hrs=62%.

Rain, 3d, 4th, 7th, 8th, 15th, 19th, 27th, 28th, 29th, 30th.

Thunder and Lightning, 15th.

Gales, 35 or more miles per hour: 40m, 4th, S.; 39m, 5th, N.N.W.; 37m, 10th, W.N.W.; 36m, 12th, W.N.W.; 53m, 15th, S.; 47m, 16th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.94	29.78	29.882	79.5	3 P	57.0	12 P	68.3	68.3	61.0	13.7
2	30.10	29.94	30.035	70.0	5:30 P	45.5	5 A	57.7	59.5	56.3	14.0
3	30.09	30.03	30.066	73.0	12 M	47.5	1:30 A	60.3	62.8	56.5	13.4
4	30.11	29 66	29.814	61.5	9 P	54.5	5 A	58.0	58.1	56.3	0.0
5	30.10	29.71	29 961	68.5	4 P	46.0	12 P	57.3	58.5	52.0	14.2
6	30.19	30.09	30.169	76.5	4:30 P	39.0	5:30 A	57.7	58.0	51.5	13.2
7	30.20	29.97	30.078	83.5	3:30 P	43.0	5 A	63.3	65.2	58.5	12.7
8	30.22	29 92	30.059	81.0	11:30 A	58.5	12 P	69.7	69.2	62.0	9.1
9	30.29	30.09	30.206	67.5	4:30 P	54.0	7 A	60.7	59.3	54.3	7.7
10	30.09	29.71	29.837	87.0	3 P	53.5	4 A	70.3	69.7	61.0	11.3
11	29.81	29.75	29.787	87.5	3:30 P	57.5	5:30 A	72.5	73.6	70.0	12.2
12	29.88	29.71	29.795	87.0	3 P	58 0	4 A	72.5	72.9	63.7	13.7
13	29.95	29.86	29.921	80 0	2:30 P	54.5	5 A	67.3	69.0	67.0	11.7
14	30.02	29 93	29.976	78.0	5 P	53.5	4 A	65.7	64.7	59.3	11.8
15	29.93	29.74	29.815	71.0	3 P	52.5	5 A	61.7	60.3	56.0	5.2
16	29.96	29 70	29.843	67.5	3:30 P	49.0	12 P	58.3	56.5	50.3	7.4
17	30.12	29.96	30.087	78.5	4 P	45.5	5:30 A	62.0	61.4	54.3	14.6
18	30.13	29.98	30.058	78.0	3 P	47.5	5:30 A	62.7	63.5	54.7	12.8
19	30.01	29.64	29.815	71.0	12:30 P	53.0	5 A	62.0	61.5	58.3	4.3
20	30.06	29.66	29.947	67.5	5:30 P	45.5	5:30 A	56.5	56 8	47.7	13.2
21	30.10	29.96	30.039	77.0	2 P	48.5	2 A	62.7	62 5	54.0	6.5
22	30.00	29.93	29.976	82.5	5:30 P	55.5	4 A	69.0	67.7	60.5	9.4
23	30 00	29.87	29.957	82.5	1 P	53.5	5 A	68.0	69.5	63 0	10.7
24	29.93	29 80	29 866	90.5	3 P	64.5	5 A	77.5	77.2	71.7	9.7
25	29.95	29.79	29.847	89.5	2 P	67.5	11:30 P	78.5	79.4	71.7	12.9
26	30.09	29 95	30.017	84.0	4:30 P	56.5	5:30 A	70.3	71.4	6 55	12.0
27	30.02	29.96	29.980	71.5	3 P	59.0	5:30 A	65.3	64.9	63.5	1.7
28	29.99	29.87	29 939	61.5	0 A	56.0	12 P	58 7	58.8	57.0	0.0
29	29.87	29.97	29.795	69.5	2:30 P	56.0	0 A	62.7	61.1	59.0	2.1
30	30.10	29.83	29.992	66.0	11 A	53.0	12 P	59.5	61.2	58.5	2.1

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	57.0	.643	74.0	N.W.	146	4.5	30	2 P				
2	52.5	.527	77.0	N.N.W.	144	4.0	28	2 P				
3	50.0	.608	59.0	W.N.W.	188	5.5	33	2 P	10 P	12 P	.10	
4	55.0	.480	91.0	S.	212	8.0	40	12 M	0 A	11 P	.51	
5	46.0	.490	64.0	N.N.W.	300	7.5	39	5 P				
6	44.5	.502	59.0	N.N.E.	92	0.0	—	—				
7	54.0	.619	69.5	S.W.	101	1.0	14	4 P	7 P		T	
8	58.5	.670	75.5	E.S.E.	92	2.0	20	1 P	7 A	2 P	T	
9	51.5	.484	78.5	S.E.	102	2.5	22	9 P				
10	56.5	.715	68.0	W.S.W.	253	7.0	37	5 P				
11	67.5	.846	80.5	N.N.W.	134	3 5	26	1 P				
12	60.0	.748	69.5	W.N.W.	157	6.5	36	6 P				
13	64.5	.761	81.0	N.N.W.	169	3.5	26	3 P				
14	56.5	.573	81.5	N.	84	0.0	—	—				
15	55 0	.478	89.5	S.	190	14.0	53	6 P	5:30 P	7 P	.48	
16	45.5	.440	69.5	N.W.	253	11.0	47	3 P				
17	47.0	.572	57.0	W.N.W.	113	1.0	14	11 A				
18	49.0	.552	63.0	S.	181	3.0	24	2 P				
19	57.0	.528	87.5	S.	166	3.0	24	2 P	1:30 P	12 P	.69	
20	41.5	.426	61.5	W.NW.	312	5.0	32	12 M				
21	48.0	.542	63.0	S.W.	121	1.5	17	4 P				
22	57.0	.628	76.0	W.	67	0 0	—	—				
23	63.5	.679	87.5	S.	114	2.0	20	4 P				
24	70.0	.876	85.0	W.S.W.	121	1.0	14	4 P				
25	68.5	.968	73 0	W.N.W.	258	5.5	33	4 P				
26	62.5	.762	74.5	S.S.W.	114	1.7	17	3 P				
27	62.5	.621	91.0	S.	67	0.0	—	—	5 A	12 P	.15	
28	56.0	.487	93 0	N.N.E.	87	0.0	—	—	0 A	12 P	.33	
29	58.0	.521	94.5	N.N.E.	47	0.0	—	—	2 P	7:30 P	.05	
30	57.0	.523	90.5	W.	83	0.0	—	—	8 A	10 A	.01	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during June was generally seasonable and free from unusual features. Comparatively clear and cool, with a rather large wind movement and considerably deficient in precipitation give a fair summary of the prevailing conditions. Traces of frost were reported, on two dates, from the low grounds in the vicinity, but the temperature did not fall low enough for the formation of frost at the station.

A comparison of the records of the various weather elements with the normals of the station shows the following features: The maximum and mean barometer records were practically normal. The minimum barometer was not as low as usual, giving a comparatively small range.

The total wind movement was about twenty percent more than the average, and more variable in direction than usual. A comparatively large number of gales were noted, nearly all during the first half the month.

The maximum and minimum temperatures were both practically normal while the mean temperature was about a degree and a half lower than the normal. The greatest daily range of temperature, on the 7th, was an unusually large amount for that feature.

The mean dew point was slightly below the normal while the relative humidity was several points higher than the average, notwithstanding the small amount of cloudy weather.

The total precipitation was about seventy percent of the normal and was fairly well distributed throughout the month. Only a single thunder storm was noted during the month.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 307. JULY, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 29 92, 30th, 9 P.
Minimum reduced to freezing, 29.36, 20th, 0 A.
Reduced† maximum reading, 30.21, 30th, 9 P.
Reduced† minimum reading, 29.66, 20th, 0 A.
Mean semi-daily reduced, ... 29.981
Monthly range, ... 0.55

***Air Temperature.** In Degrees Fahr.

Highest, ... 89.0, 13th, 3:30 P.
Lowest, ... 45.0, 1st, 4-30 A.
Mean hourly, ... 67.7
Mean of means of max. and min., ... 68.6
Mean sensible (wet bulb), ... 62 6
Monthly range, ... 44.0
Highest mean daily, ... 78.0, 17th
Lowest mean daily, ... 56.5, 3d
Mean maximum, ... 78.5
Mean minimum, ... 58.6
Mean daily range, ... 19.9
Greatest daily range, ... 33.0, 21st
Least daily range, ... 6.0, 3d

Humidity.

Mean dew point, ... 60.0
Mean force of vapor, ...663
Mean relative humidity, ... 80.7

Precipitation. In inches.

Total precipitation, ... 3.53
Number of days on which .01 inch or more rain fell 14

*Temperature in ground shelter.
† Reduced to freezing and sea-level.

Wind.

Total movement, ... 3555m.
Greatest daily movement, ... 254m., 17th
Least daily movement, ... 35m., 23d
Mean daily movement, ... 115 m
Mean hourly velocity, ... 4.8 m
Maximum pressure per square foot, 8.0 lbs.= 40m. per hour, 21st, 12 M., W.S.W.
Maximum velocity for 5 minutes, 30m. per hour, 21st, 2P., W.S.W.
Prevailing Direction, South.

Summary.

South	19 per cent.
South Southwest	13 " "
South Southeast	13 " "
Northwest	10 " "
North Northeast	10 " "
Other directions	35 " "

Weather.

Mean cloudiness observed, ... 69 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 221 hrs.=48 per cent.
Number of clear days, ... 7
Number of fair days, ... 16
Number of cloudy days, ... 8

Bright Sunshine.

Number of hours recorded, . . 241 hrs=52%.
Rain, 1st, 2d, 3d, 6th, 7th, 9th, 10th, 11th, 15th, 17th, 18th, 21st, 23d, 28th, 29th, 30th.
Thunder and Lightning, 9th, 11th, 12th, 17th, 18th, 21st.
Gales, 35 or more miles per hour: 40m, 21st, W.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb	
1	30.19	29.99	30.110	73.0	2 P	45.0	4:30 A	59.0	59.8	58.5	9.0
2	30.03	29.86	29 927	69.0	3 P	56.0	12 P	62.5	60.1	56.3	6.0
3	30.17	30.03	30.129	60.0	6 P	54.0	5 A	57.0	56.5	55.3	0.6
4	30.17	30.06	30.137	81.0	4:30 P	52.5	5 A	66.7	64.3	61.0	14.0
5	30.15	30.04	30 130	78.0	2 P	58.0	4 A	68.0	65.2	60.5	7.1
6	30.15	29 93	30.107	75.0	1 P	56.0	5:30 A	65.5	65.2	59.3	12.5
7	29.95	29.77	29 842	68.0	12 M	57.0	1 A	62.5	62.3	60.5	0.1
8	30.12	29.95	30.077	83.5	1:30 P	62.0	4 A	72.7	71.5	66.7	6.8
9	30.15	30.04	30.111	81.0	3 P	63.0	12 P	72.0	69.3	64.7	5.6
10	30.07	29 97	30.021	75.0	1:30 P	63.0	4 A	69.0	68.5	64.0	4.7
11	29.98	29.85	29.912	82.5	2:30 P	64 0	11:30 P	73.3	70.9	65 3	8.6
12	29.90	29.82	29.863	87.0	4 P	64.0	4:30 A	75.5	73.9	68.3	8.2
13	29.95	29.85	29 911	89.0	3:30 P	64 0	5:30 A	76.5	75.1	66.5	10.3
14	30.02	29.95	29.991	81.0	3:30 P	59.0	5 A	70.0	70.6	63.7	8.7
15	29.97	29.88	29 911	84.0	5 P	64.0	6 A	74.0	72.2	67 3	6.7
16	29.95	29.82	29.885	85.0	4:30 P	70 0	6 A	77.5	75.6	71.5	7.1
17	29.82	29.67	29.751	88.0	2 P	73.0	5 A	80.5	78.0	74.0	6.9
18	29.82	29.68	29.755	84.0	4 P	67.0	12 P	75.5	76.3	69.5	14.0
19	29.95	29.82	29.868	77.0	2:30 P	55.0	12 P	66 0	67.2	62.5	12.4
20	30.05	29.66	30.017	78.0	6:30 P	47.5	5:30 A	62.7	62.5	53.0	12.9
21	30.00	29.81	29.928	86.5	1 P	53.5	6 A	70.0	67.6	64.7	7.5
22	30.14	30 00	30 121	80.5	5 P	50.5	6 A	65.5	65 8	56.7	12.3
23	30.13	29.92	30.014	66.0	2 P	54.5	5 A	60.3	60.7	59.3	0.0
24	29.97	29.88	29.932	83.5	4:30 P	58.5	5 A	71.0	69.3	63.3	8.0
25	29.90	29.76	29.837	84.0	4 P	64.5	6 A	74.3	72.7	68.3	8.6
26	29.95	29.82	29.888	85.5	3:30 P	61.5	5:30 A	73.5	74.5	69.0	13.7
27	29.99	29.91	29.959	83 0	3 P	56.0	5:30 A	69.5	70.0	39.0	8.6
28	29.96	29 90	29.945	71.5	11 A	59.0	7 A	65.3	64 8	59.3	0.0
29	30.12	29.92	30.022	66 5	11 A	56.5	12 P	61.5	60.2	57.0	2.3
30	30 21	30.12	30.203	71.5	2:30 P	55.5	1 A	63.5	62.6	56.7	8.2
31	30.21	29 96	30,093	77.5	2:30 P	53.5	5:30 A	65.3	65.9	59.3	9.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.*	Ending.	Total in Inches. Rain.**	Snow.
1	57.0	.533	87.5	S.E.	74	1.0	14	7 P	5 P	12 P	.38	
2	54.5	.480	88.5	E.N.E.	178	1.0	14	12 M	0 A	7 P	.42	
3	54.5	.455	92.5	N.N.E.	36	0.0	—	—	7 A	3 P	.21	
4	60.0	.585	90 5	N.N.E.	50	0.5	10	8 P				
5	58.5	.591	85.0	S.	149	4.0	28	2 P				
6	55.5	.605	73.5	S.E.	108	0.5	10	10 P	4:30 P	12 P	.30	
7	59.5	.558	90.5	S.S.W.	251	3.5	26	5 P	0 A	7 P	.30	
8	64.5	.750	81.5	S.	230	3.0	24	2 P				
9	63.5	.656	89.0	S.E.	90	0.5	10	4 P	4 P	5 P	.36	
10	62.0	.679	83.0	S.	85	0 5	10	9 P	10 P	12 P	.01	
11	64 0	.656	92 5	S.	162	2.0	20	6 P	6:30 P	8:30 P	.50	
12	67.0	.765	87.5	W.	69	0.0	—	—				
13	63.5	.758	78.5	W.N.W.	61	0.0	—	—				
14	61.0	.691	78.5	S.S.E.	96	1.0	14	3 P				
15	65.5	.742	86.5	S.	46	0.0	—	—	1 A	9 P	T	
16	70.0	.850	88.0	S.S.W.	117	3.0	24	3 P				
17	73.0	.901	90.0	S.S.W.	254	4.5	30	4 P	4 P	5 P	.21	
18	67.0	.857	79.0	N.W.	67	2.0	20	12 M	1 A	2 A	.07	
19	58.5	.711	69 0	N.N W.	243	2.0	20	3 P				
20	45.5	.549	56 5	N.W.	80	2.0	20	11 A				
21	62.0	.705	80.5	S.S.W.	147	8.0	40	12 M	2 P	3 P	.36	
22	50.5	.633	58.0	N.	142	3.0	24	1 P				
23	58.0	.529	92.0	W.S.W.	35	0.0	—	—	9 A	8 P	.25	
24	60.0	.677	79.5	E.	84	0.0	—	—				
25	67.0	.765	87.5	S.	96	1.0	14	12 M				
26	66.5	.927	70 5	W.NW.	117	2.5	22	11 A				
27	52 0	.710	55.5	N.W.	80	0.0	—	—				
28	56.5	.572	81.3	S.E.	70	0.0	—	—	6 P	10 P	.01	
29	55.0	.514	83.5	N.N.E.	113	2.5	22	2 P	6 A	3 P	.15	
30	53.0	.538	76 0	E.N.E.	162	2.0	20	9 A	7 P	8 P	T	
31	55.0	.623	70.0	E.S.E.	63	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during July was more cloudy than usual with precipitation on about half the days. Notwithstanding the frequency of the rains the total precipitation was considerably less than the normal. The general absence of extremely warm days was also an important feature. Numerous thunder storms were also noted, several of considerable severity.

The best estimate however of the weather conditions prevailing can be obtained by a comparison of the records of the several weather elements with the corresponding normals of the station. Such comparison shows the following features of interest.

The mean barometer was slightly higher than the normal and the range was the smallest since 1899. While the minimum pressure was considerably above the normal, the maximum was correspondingly low. Owing to the small fluctuation in pressure but one gale was noted during the month.

The mean temperature was about three degrees below the normal, making it the coolest July since 1891. The maximum temperature was the lowest since 1889, excepting only 1906, when the maximum record was 88.5 degrees. The mean maximum was also an unusually low record. The minimum temperature was about the usual value and was recorded on the first day of the month.

The mean dew point was but slightly below the normal while the relative humidity was the highest since 1906.

Although there were numerous rainstorms the total precipitation was only about 80 per cent of the normal. In this connection it should be remembered that July is the month with the greatest precipitation record at this station, due to the two extremely large monthly records of 1889 and 1897, when 10.52 and 14.51 inches were respectively recorded.

The total wind movement was practically normal, but the large amount from the south was very unusual for this station.

The amount of sunshine was considerably less than the normal, the record showing the smallest amount since 1902.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 308. AUGUST, 1914

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 29 97, 26th, 8 A.
Minimum reduced to freezing, 29.42, 24th, 5 A.
Reduced† maximum reading, 30.26, 26th, 8 A.
Reduced† minimum reading, 29.71, 24th, 5 A.
Mean semi-daily reduced, ... 30.008
Monthly range, ... 0.55

***Air Temperature.** In Degrees Fahr.

Highest, ... 95.0, 9th, 2:30 P.
Lowest, ... 47.5, 25th, 6 A.; 26th, 6 A.
Mean hourly, ... 68.9
Mean of means of max. and min., ... 69.7
Mean sensible (wet bulb), ... 63 5
Monthly range, ... 47.5
Highest mean daily, ... 79 7, 10th
Lowest mean daily, ... 60.5, 29th
Mean maximum, ... 79 9
Mean minimum, ... 59.6
Mean daily range, ... 20.3
Greatest daily range, ... 32.0, 9th
Least daily range, ... 3.5, 29th

Humidity.

Mean dew point, ... 60.8
Mean force of vapor, ...687
Mean relative humidity, ... 80.3

Precipitation. In inches.

Total precipitation, ... 5.11
Number of days on which .01 inch or more rain fell 10

* Temperature in ground shelter.
† Reduced to freezing and sea-level.

Wind.

Total movement, ... 3198m.
Greatest daily movement, ... 226m., 11th
Least daily movement, ... 43m., 26th
Mean daily movement, ... 103 m
Mean hourly velocity, ... 4.3 m
Maximum pressure per square foot, 17.0 lbs.= 58m. per hour, 21st, 1 P., N.N.W.
Maximum velocity for 5 minutes, 30m. per hour, 21st, 1 P., N.N.W.
Prevailing Direction, West.

Summary.

South Southwest . . . . . 32 per cent.
North . . . . . 10 " "
Northwest . . . . . 10 " "
North Northeast . . . . . 10 " "
Other directions . . . . . 38 " "

Weather.

Mean cloudiness observed, ... 61 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 220 hrs.=51 per cent.
Number of clear days, ... 2
Number of fair days, ... 19
Number of cloudy days, ... 10

Bright Sunshine.

Number of hours recorded, . . 209 hrs=49%.
Rain, 1st, 3d, 5th, 11th, 12th, 16th, 17th, 18th, 19th, 20th, 21st, 24th, 28th, 29th.
Thunder and Lightning, 3d, 11th, 20th, 24th.
Gales, 35 or more miles per hour: 58m, 21st, N.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb	
1	29.96	29.89	29.940	82.5	2:30 P	57.0	6:30 A	69.7	69.1	61.0	8.7
2	29.96	29.77	29.868	85.0	2:30 P	56.0	4 A	70.5	70.7	65.5	9.0
3	30.03	29.80	29.924	82.0	3:30 P	63.0	6 A	72.5	69.9	61.7	9.7
4	30.14	30.03	30.125	70.5	3 P	56.5	5 A	63.5	64.5	59.5	0.6
5	30.13	30.09	30.118	72.0	5 P	59 5	4:30 A	65.7	64.5	61.7	1.7
6	30.16	30.03	30.125	83.0	3:30 P	61.0	4:30 A	72.0	70.5	65.3	9.9
7	30.11	29 98	30.065	86.5	3:30 P	63.5	2 A	75.0	72.1	67.5	7.3
8	30.05	29.95	30.015	90.5	4 P	70.0	6 A	80.3	77.0	70.5	6.9
9	30.08	29.98	30.047	95.0	2:30 P	63 0	5:30 A	79.0	78.3	71.3	9.4
10	30.05	29.97	30 020	92.5	2 P	71.0	5:30 A	81.7	79.7	72.3	8.5
11	30.00	29.91	29 957	83 0	1 P	71.0	12 P	77.0	76.1	71.7	4.7
12	30.07	29 96	30.051	71.0	0 A	62.0	12 P	66 5	66.3	64.3	0.0
13	30.06	29.96	30.025	82.0	5 P	59.0	12 P	70.5	69.4	62.5	11.7
14	30.00	29 83	29 913	80.5	1 P	52.0	5 A	66.3	67.9	60.7	8.3
15	29.96	29.84	29.905	83 5	2 P	62.5	7 A	73 0	71.1	62.3	9.1
16	30.04	29 95	30.030	81.0	2:30 P	54.0	5:30 A	67.5	69.4	62.0	10.8
17	30.02	29.94	29 989	80 0	2 P	61.0	12 P	70.5	67 8	63.7	2.8
18	30.01	29.90	29.958	76 5	5 P	57.5	5:30 A	67.0	66.5	65.0	0.6
19	30.06	29.91	30.003	85 0	3 P	67.0	5:30 A	76.0	74.5	70.0	10.3
20	30.10	29 98	30.063	77.5	3 P	64.0	12 P	70.7	70.5	66.0	6.0
21	29.98	29.80	29 901	73.5	1 P	61.0	5:30 A	67.3	65.3	63.5	2.3
22	30.02	29.85	29.987	83.5	3:30 P	59.0	6 A	71.3	69.7	61.3	10.7
23	39.05	29 78	29.926	82.0	1:30 P	54.5	5 A	68.3	69.5	62 5	10.3
24	30.05	29.71	29.849	78.0	3:30 P	56.0	12 P	67.0	69.9	63.5	2.0
25	30.20	30 05	30.153	75.0	3 P	47.5	6 A	61.3	60.7	53.5	10.3
26	30.26	30.15	30 213	77.0	4 P	47.5	6 A	62.3	61 2	55.3	11.4
27	30.21	30 09	30.157	77.0	3:30 P	55.0	6 A	66.0	64.1	59.3	5.5
28	30.12	30.05	30.099	71.5	1:30 P	61.0	3 A	66.3	64.5	60.3	0.0
29	30.09	29.84	29.948	62.5	0 A	59.0	12 P	60.7	60 5	60.0	0.0
30	29.93	29.80	29.885	77.0	4:30 P	58.0	5 A	67.5	65.5	60.3	9.5
31	30.03	29.91	29.974	80.5	6 P	58.0	3 A	69.3	68.6	63.0	10.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	56.0	.718	64.5	N.W.	78	3.5	26	2 P	7 P		T	
2	63.5	.716	88.5	S.S.W.	147	4.0	28	3 P				
3	57.0	.777	66.5	N.N.E.	70	0.0	—	—	4 A	5:30 P	.06	
4	57.0	.593	77.0	N.E.	125	0.0	—	—				
5	60.5	.595	89.5	N.N.E.	109	0.0	—	—	2:30 A	5 A	.20	
6	63.0	.718	80.0	S.	116	0.0	—	—				
7	66.0	.741	86.5	S.S.W.	142	1.5	17	7 P				
8	68.0	.891	78.0	S.S.W.	103	0.0	—	—				
9	70 0	.895	84.5	S.S.W.	56	0.0	—	—				
10	69.5	.941	77 0	S.	185	5.5	33	2 P				
11	70.0	.861	85.5	S.S.W.	226	3.0	24	11 A	3 P	9 P	.38	
12	63.0	.648	88.5	N.	108	1.5	17	8 A	1 P	2 P	.01	
13	59 0	.668	76.0	N.N.W.	53	0.0	—	—				
14	57.5	.637	75.5	S.E.	126	2.0	20	12 M				
15	59.0	.673	77.0	N.W.	83	1.0	14	1 P				
16	57.5	.755	62 5	W.N.W.	94	0.5	10	1 P	11 P		T	
17	62 0	.640	87.5	S.S.W.	65	4.5	30	3 P	3 P	6 P	.19	
18	64.5	.648	95.0	S.S.W.	65	2.0	20	3 P	10 A	10 P	.29	
19	68.5	.806	86.5	W.	66	0.0	—	—	7 P		T	
20	63.5	.722	83.0	N.E.	72	0.0	—	—	0 A	12 P	1.85	
21	62.5	.605	94.5	E.	70	17.0	58	1 P	0 A	7 P	.87	
22	57.0	.661	72.0	N.	104	3.0	24	10 A				
23	59 0	.687	75.5	S.S.W.	127	3 5	26	2 P				
24	60.5	.695	76.0	W.NW.	190	1.0	14	5 P	10:30A	11 A	T	
25	48.5	.499	70.0	N.	77	0.5	10	2 P				
26	51.0	.521	73.0	N.N.E.	43	0.0	—	—				
27	57.0	.573	82.0	S.S.W.	99	1.5	17	5 P				
28	57.5	.586	83.0	S.S.W.	137	0.5	10	1 A	3 P	12 P	.11	
29	59 5	.538	94.5	E.N.E.	66	0.0	—	—	0 A	9 P	1.15	
30	58.5	.583	85.0	N.W.	101	2.0	20	12 M				
31	59.5	.691	75.0	W.	95	0.5	10	10 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was more than usually cloudy with a comparatively high relative humidity and large precipitation. From the 6th to the 12th there was a period of both high temperature and high humidity combined making it the most unpleasant part of the month. Nearly all the precipitation occurred during the last half the month, the storm of the 20th-21st was exceptionally severe. More than one-half the total precipitation occurred during that period; as well as the high gale and heavy thunderstorm of the month. The last half the month was generally cooler than the mean for the month.

Comparing the records of the several weather elements for the month with the corresponding normals the following features are noted: The mean barometer was practically normal and the range of pressure unusually small, even for August—the month of least range. The interval between the minimum and maximum pressures was only 51 hours.

The total wind movement was practically normal, but the number of days with a prevailing direction of South Southwest was exceptionally large.

The maximum and minimum temperatures were considerably above the usual values for these records, and the mean hourly temperature was a degree above the normal. The monthly range was slightly smaller than usual.

The mean dew point was nearly normal and the mean relative humidity the highest since 1906.

The total precipitation was nearly an inch more than usual and more than three-fourths occurred during two storms. Norwithstanding the large amount of rain less than one-third the days of the month showed a measurable amount.

The amount of sunshine was considerably less than the normal; only two days being recorded as clear.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 309. SEPTEMBER, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.23, 14th, 9 A.
Minimum reduced to freezing,	29.41, 24th, 3 P.
Reduced† maximum reading,	30.53, 14th, 9 A.
Reduced† minimum reading,	29.69, 24th, 3 P.
Mean semi-daily reduced,	30.131
Monthly range,	0.84

***Air Temperature.** In Degrees Fahr.

Highest,	96.5, 22d, 3:30 P.
Lowest,	24.5, 29th, 6 A.
Mean hourly,	60.2
Mean of means of max. and min.,	61.0
Mean sensible (wet bulb),	53.1
Monthly range,	72.0
Highest mean daily,	78.7, 2d
Lowest mean daily,	42.0, 28th
Mean maximum,	75.6
Mean minimum,	46.3
Mean daily range,	29.3
Greatest daily range,	44.5, 22d
Least daily range,	13.0, 25th

Humidity.

Mean dew point,	48.9
Mean force of vapor,	.503
Mean relative humidity,	74.3

Precipitation. In inches.

Total precipitation,	.52
Number of days on which .01 inch or more rain fell	6

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	2992m.
Greatest daily movement,	266m., 26th
Least daily movement,	22m., 22d
Mean daily movement,	100 m
Mean hourly velocity,	4.2 m
Maximum pressure per square foot,	11.0 lbs.= 47m. per hour, 28th, 10 A., N.N.E.
Maximum velocity for 5 minutes,	30m. per hour, 28th, 10 A., N.N.E.
Prevailing Direction,	North.

Summary.

North Northeast	20 per cent.
North	13 " "
Southwest	13 " "
East Southeast	10 " "
Other directions	44 " "

Weather.

Mean cloudiness observed,	27 per cent.
Total cloudiness recorded by the Sun Thermometer,	127 hrs.=34 per cent.
Number of clear days,	12
Number of fair days,	13
Number of cloudy days,	5

Bright Sunshine.

Number of hours recorded, 246 hrs=66%.

Rain, 3d, 6th, 24th, 25th, 27th, 28th, 29th, 30th.

Frosts, 28th, 29th.

Thunder and Lightning, 2d, 3d, 30th.

Hail, 28th.

Gales, 35 or more miles per hour: 36m, 7th, W.N.W.; 36m, 26th, N.; 47m, 28th, N.N;E.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.09	29.93	30.017	85.0	2:30 P	54.5	5:30 P	69.7	70.6	66.0	8.6
2	29.97	29.84	29.892	90.0	4 P	71.0	3 A	80.5	78.7	73.7	8.4
3	29.97	29.87	29.912	82.0	2 P	64.0	12 P	73.0	73 2	69.0	8.9
4	30.00	29 84	29.920	73.0	12 M	56.0	12 P	65.5	64.2	58.0	4.9
5	30.12	30.00	30.082	74.0	4:30 P	48.0	6:30 A	61.0	60.9	55.0	11.1
6	30.08	29.82	29 967	74.5	2 P	45 0	6 A	59 7	61.1	56.0	5.7
7	29.89	29.71	29 811	79.0	2 P	58.0	12 P	68.5	68.3	60.3	9.1
8	30.12	29 87	30.053	63.5	3 P	45.0	12 P	54.3	55.5	47.3	5.9
9	30.24	30.12	30.199	60.0	1:30 P	36.5	6 A	48.3	50.0	45.7	7.0
10	30.24	30.13	30.199	65.0	2 P	38 5	6 A	51.7	52 0	45.7	7.5
11	30.20	30.13	30 193	63.5	3 P	36.0	5:30 A	49.7	50.0	46.0	5.2
12	30.35	30.20	30.304	68.0	2 P	37.0	6 A	52.5	52.6	47.3	8.3
13	30.51	30.35	30.469	72.0	3 P	42.0	6 A	57.0	56.0	50.0	11.1
14	30.53	30.40	30.478	76.5	3:30 P	38.5	6 A	57.5	56.6	48.0	11.0
15	30.44	30.30	30.383	79.0	3:30 P	39.0	6 A	59.0	58.3	50.3	10.6
16	30.43	30.33	30.387	84.5	4:30 P	41.0	6 A	62.7	60.5	51.0	10.6
17	30.37	30.22	30.299	85.0	4 P	44.5	6 A	64 7	63.0	52.7	10.5
18	30 22	30.04	30.135	87.0	3 P	46.0	6 A	66.5	67.2	57.0	10.3
19	30.16	30.07	30.148	80 0	3:30 P	52.0	12 P	66.0	64.3	55.3	9.6
20	30.17	30.00	30.101	83.0	2:30 P	43.0	6 A	63.0	62.0	54.0	9.7
21	30.11	29.98	30.063	93.0	3 P	50.5	6 A	71.7	68.9	60.0	10.5
22	30.06	29.89	29.969	96 5	3:30 P	52.0	6 A	74.2	71.5	62.3	10.2
23	29.92	29.74	29.837	92.5	3 P	55 0	7 A	73.7	72 8	64 0	9.3
24	29.87	29.69	29 808	84.5	2 P	58 5	12 P	71.5	68.2	61.0	6.9
25	30.00	29 85	29.967	67.0	2:30 P	54.0	12 P	60.5	59.0	54.0	4.7
26	30.15	29.98	30.085	61.5	2 P	42.0	12 P	51.7	51.7	41.7	10.5
27	30.26	30.01	30.147	64.0	12 M	41.0	0:30 A	52.5	49.6	41.7	4.0
28	30.38	30.26	30.342	56.0	1 P	31.0	6 A	43.5	42.0	36.3	4.5
29	30.41	30 04	30.267	64.0	3 P	24.5	6 A	44.3	44.0	36.5	9.5
30	30.07	29.85	29.960	65.0	1:30 P	45.5	5 A	55.3	52.9	47.3	2.4

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	64.0	.739	81.5	S.W.	97	1.5	17	2 P				
2	69.0	.987	78.5	S.W.	187	1.0	14	9 P				
3	67.0	.789	84.0	N.W.	89	0.0	—	—	10:30P	11 P	.23	
4	53.5	.583	72.5	N.	58	0.0	—	—				
5	50.5	.529	70.5	S.W.	59	0.0	—	—				
6	54.5	.507	86.5	S.S.W.	131	3.0	24	2 P	5 P	6 P	T	
7	55.0	.655	68.5	W.N.W.	249	6.5	36	2 P				
8	42.0	.397	69 5	N.N.W.	200	3.0	24	3 A				
9	41.5	.361	72.0	N.N.E.	138	4.5	30	10 A				
10	39.0	.384	62.0	N.N.E.	120	1.0	14	5 P				
11	41.5	.363	74 0	N.E.	67	0.0	—	—				
12	42.5	.393	70.5	N.N.E.	54	0.0	—	—				
13	45.5	.431	70.5	E.N.E.	75	0.0	—	—				
14	42.5	.411	73.5	E.S.E.	50	0.0	—	—				
15	47.5	.419	79.0	E.S.E.	36	0.0	—	—				
16	49.0	.415	86.0	E.S.E.	32	0.0	—	—				
17	49.5	.473	76.5	E.N.E.	64	0.0	—	—				
18	53.0	.591	70.5	N.N.E.	86	1.0	14	11 A				
19	51.5	.521	74.0	N.	98	0.0	—	—				
20	52 0	.470	85.5	S.W.	46	0.5	10	3 P				
21	57.0	.609	78.5	W.NW.	43	0.0	—	—				
22	59.5	.671	78.5	W.S.W.	22	0.0	—	—				
23	61.5	.734	78.0	S.	62	1.0	14	6 P				
24	58.5	.606	82.0	W.	87	1.5	17	6 P	11 P	12 P	.03	
25	51.5	.473	80.5	N.N.E.	83	0.0	—	—	0 A	5 A	.08	
26	30.5	.350	49.5	N.	266	6 5	36	11 A				
27	35.0	.323	65.0	N.N.W.	210	4.5	30	12 M		1 P	T	
28	29.5	.247	68.0	N.N.E.	109	11.0	47	10 A	10 A	11 A	.03	
29	28.5	.275	60.5	N.E.	40	0.0	—	—	7 P	12 P	.04	
30	44 5	.367	81.5	N.	134	2.0	20	3 P	0 A	2 P	.11	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

During the month the most prominent features of the weather were the unusually small precipitation and large amount of sunshine. Variations in temperature were more noticeable than usual, many of the days showing a variation in temperature of more than 30 degrees and several exceeding 40 degrees. The monthly range of temperature was the largest September record since this station was established.

The mean barometer was unusually high, and the maximum and minimum records both considerably greater than usual at this time of year. The total wind movement was about ten per cent less than the normal, and wind from the Northeast quadrant much more frequent than usual. Gales were infrequent; the heaviest lasted but a few minutes and was accompanied by a small amount of hail.

The mean temperature was about one degree lower than the normal, while the maximum was nearly ten degrees higher than the average Semtember maximum. The maximum temperature recorded on the 22d was the highest temperature for the year at this station. Unusually warm weather prevailed for four days beginning with the 21st.

The minimum temperature was about eight degrees below the normal and made a new minimum record for the month at this station. Frost was reported from the low lands in this vicinity on the 9th, 10th and 11th, but the first frost at the station occurred on the 28th. On the 29th a killing frost occurred and thin ice was formed in places.

The mean dew point and relative humidity were both considerably lower than usual.

The total precipitation was about one-eighth of the normal and the smallest September record at Amherst since 1865. For a period of three weeks, from the 3d to the 24th, not a measurable amount was recorded.

The sunshine record was unusually large, the number of hours noted being exceeded but twice in the past twenty-five years.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 310. OCTOBER, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30 30, 14th, 10 A.
Minimum reduced to freezing, 29.31, 26th, 3 P.
Reduced† maximum reading, 30.60, 14th, 10 A.
Reduced† minimum reading, 29.60, 26th, 3 P.
Mean semi-daily reduced, ... 30.095
Monthly range, ... 1.00

***Air Temperature.** In Degrees Fahr.

Highest, ... 84.5, 3d, 4:30 P.
Lowest, ... 22.0, 28th, 2:30 A.
Mean hourly, ... 53.5
Mean of means of max. and min., ... 54.2
Mean sensible (wet bulb), ... 47.6
Monthly range, ... 62.5
Highest mean daily, ... 68.3, 11th
Lowest mean daily, ... 35.0, 27th
Mean maximum, ... 66.1
Mean minimum, ... 42.2
Mean daily range, ... 23.9
Greatest daily range, ... 50.5, 3d
Least daily range, ... 4.5, 17th

Humidity.

Mean dew point, ... 42.9
Mean force of vapor, ...393
Mean relative humidity, ... 75.3

Precipitation. In inches.

Total precipitation, ... 2.09
Number of days on which .01 inch or more rain fell 5

*Temperature in ground shelter.
† Reduced to freezing and sea-level.

Wind.

Total movement, ... 3612m.
Greatest daily movement, ... 306m., 27th
Least daily movement, ... 20m., 3d
Mean daily movement, ... 117 m
Mean hourly velocity, ... 4.9 m
Maximum pressure per square foot, 6.5 lbs.= 36m. per hour, 27th, 10 A., N.W.
Maximum velocity for 5 minutes, 24m. per hour, 30th, 2:30 P., W.N.W.
Prevailing Direction, Southwest.

Summary.

North . . . . . 19 per cent.
South . . . . . 19 " "
Southwest . . . . . 16 " "
East . . . . . 10 " "
Other directions . . . . . 36 " "

Weather.

Mean cloudiness observed, ... 44 per cent.
Total cloudiness recorded by the Sun Thermometer, ... 177 hrs.=52 per cent.
Number of clear days, ... 8
Number of fair days. 10
Number of cloudy days, ... 13

Bright Sunshine.

Number of hours recorded. . . 164 hrs=48%.
Rain -9th, 16th, 17th, 18th, 19th, 24th, 27th, 29th, 30th.
Snow, 27th.
Frosts, 2d, 3d, 4th, 28th.
Gales, 35 or more miles per hour: 36m, 27th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.27	30.07	30.225	66.5	2:30 P	41.0	12 P	53.7	52.5	46.7	3.5
2	30.34	30.21	30.312	77.5	3:30 P	33.0	6 A	55.3	52.2	44.0	9.5
3	30.26	30.06	30.192	84.5	4:30 P	34.0	7 A	59.3	55.7	44.0	9.8
4	30.18	30.06	30 143	82.5	3 P	38.5	6 A	60 5	59.1	52.7	9.4
5	30.12	29.99	30.067	81.0	3 P	52.0	6 A	66 5	64.5	55.7	8.3
6	30.30	30.05	30.259	61.0	12 M	44.0	12 P	52 5	53.8	50.7	0.0
7	30.30	30.10	30.211	59.5	4 P	42.0	1 A	50.7	50.5	44.3	0.2
8	30.10	29.96	30.018	77.0	3:30 P	45.5	6:30 A	61.3	58.9	51.7	8.0
9	30.13	29.93	30.099	78.0	3 P	49 0	3:30 A	63.5	61.4	57.0	5.9
10	30.13	29.98	30.061	77.0	3 P	59.0	0 A	68.0	66.0	61.7	1.6
11	29.98	29.81	29.897	80.5	3:30 P	61.0	12 P	70.7	68.3	61.7	3.8
12	30.14	29.93	30.037	70.5	1 P	50.5	5 A	60 5	59.6	54.5	8.7
13	30.50	30.14	30.395	60.5	3:30 P	37.0	12 P	48.7	49 8	41.7	7.1
14	30.60	30.44	30.541	57.0	1:30 P	31.0	6 A	44 0	45.5	40.0	3.3
15	30.44	30.08	30 242	69.5	12:30 P	44.0	6:30 A	56.7	57.3	52.0	6.1
16	30.08	29.96	30.015	64.0	3:30 P	59.0	12 P	61.5	62.0	61.0	0.0
17	29.96	29.80	29.848	61.0	6 P	56.5	12 P	58.7	58.4	57.7	0.0
18	29.91	29.84	29.885	70.0	3:30 P	54.0	7:30 A	62.0	57.2	53.3	4.0
19	30.09	29.89	29.973	63 5	1 P	52.0	0:30 A	57.7	57.2	54 5	2.7
20	30.26	30.09	30.229	71.0	3 P	44.0	6 A	57.5	55.1	49.3	8.8
21	30 26	30.04	30.155	76.0	2:30 P	39.0	5 A	57.5	57 4	49.7	6.9
22	30.38	30.04	30.255	70.5	1:30 P	44.0	12 P	57.3	59.0	46.7	9.5
23	30.54	30.22	30.425	57.0	3 P	32.5	6:30 A	44.7	44.8	38.5	9.1
24	30.22	29 98	30.077	60.0	3 P	40.0	3 A	50.0	48.3	44.3	0.4
25	30.13	29.81	29.997	60.0	3 P	29.5	7:30 P	44.7	45.2	37.0	8.8
26	29.81	29.60	29.689	61.0	1:30 P	42.5	7 A	51.7	51.2	44.7	6.8
27	29.99	29.66	29.885	44.0	0 A	24.0	12 P	34.0	35.0	27.7	4.4
28	30.03	29 89	29.990	52.0	2 P	22.0	2:30 A	37.0	38.6	30.0	6.6
29	30.03	29.81	29.961	53.5	2 P	34.0	6 A	43.7	45.2	39.3	1.6
30	29.87	29.74	29.813	51.0	2:30 P	40.0	12 P	45.5	43.8	38.7	0.4
31	30.05	29.87	30.041	53.5	2 P	34.0	7 A	43.7	43.5	35.0	8.8

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	43.5	.359	80.5	N.	142	1.0	14	10 A				
2	41.0	.331	82.5	N.N.W.	43	2.0	20	10 A				
3	39.0	.347	71.5	N.	20	0.0	—	—				
4	50.0	.463	80.0	E.	36	0.0	—	—				
5	53.0	.517	78.0	S.W.	101	0.5	10	11 A				
6	47.5	.425	77.5	E.S.E.	63	0.0	—	—				
7	38.0	.349	66.5	S.S.E.	83	0.5	10	11 A				
8	49.0	.442	82.0	S.	53	0.0	—	—				
9	55.5	.503	90 5	S.	104	2.5	22	8 P	7 A		T	
10	60.0	.607	86.0	S.	225	3.5	26	1 P				
11	58.5	.665	73.5	S.	221	3.5	26	12 M				
12	51.0	.497	76.0	W.N.W.	141	3.5	26	4 P				
13	35.0	.391	64.5	N.	111	0.0	—	—				
14	34.0	.298	67.5	E.	49	0.0	—	—				
15	49.0	.452	78.5	S.E.	44	0.0	—	—				
16	60.0	.561	93.0	S.W.	30	0.0	—	—	3 A	12 P	.64	
17	56.5	.491	95.5	N.	110	2.5	22	6 P	0 A	2 P	.81	
18	52.0	.425	92.5	S.	57	0.0	—	—	8 A		T	
19	53.5	.451	89.5	S.W.	53	0.0	—	—	2 A	12 M	.42	
20	47.5	.373	88.5	S.S.E.	32	0.0	—	—				
21	46.0	.455	76.5	S.W.	77	1.5	17	2 P				
22	37.0	.439	51.0	N.	185	4.0	28	11 P				
23	32.0	.274	67.5	W.	135	2.0	20	11 P				
24	41.0	.327	79.0	E.	172	2.5	22	9 P	11 A		T	
25	31.0	.265	70.0	N.	95	0.0	—	—				
26	40.0	.345	73.5	W.S.W.	140	3.0	24	12 P				
27	19.5	.180	60.0	N.W.	306	6 5	36	10 A	5 A	10 A	T	T
28	17.5	.216	49.5	S.W.	190	3.0	24	2 P				
29	33.0	.289	66 5	S.	164	4.5	30	10 P	9 P	12 P	.17	
30	33 5	.269	73.5	W.N.W.	207	5.5	33	3 P	0 A	10 A	.05	
31	25.5	.253	54.0	N.W.	223	4.0	28	12 M				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was generally seasonable and more than usually pleasant. A measurable amount of precipitation was recorded on only five days, and the drought which prevailed during the preceding month was not broken until the 16th, when a fairly heavy rainstorm occurred. A few light rains were noted later in the month, but the total rainfall was less than 60 per cent of the normal for October.

The records of the several weather elements, compared with the normals for this station, show the following features : The mean barometer was considerably higher than the normal, and the range comparatively small. The mean daily barometer fell below 30 inches but once during the first half of the month—the period which was without precipitation. The maximum and minimum pressures were not far from the normal values for these features. The total wind movement was about 90 per cent of the normal, and an unusually large per cent of the total was from the southwest quadrant. The pressure chart showed but a single gale, and that was a light one.

The mean hourly temperature was more than 3 degrees above the normal, and, excepting last year, was the warmest October since 1900.

The maximum temperature was more than 5 degrees higher than usual, while the minimum record was practically normal. The daily range of more than 50 degrees, on the 3d, was exceptionally large for this locality.

The mean dew point was slightly higher than usual and the relative humidity was practically normal.

The precipitation, already commented on, nearly all occurred during four days near the middle of the month. Notwithstanding the small precipitation the amount of cloudiness was nearly normal. The mornings, however, were much more cloudy than the evenings.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 311. NOVEMBER, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30 47, 29th, 10A.
Minimum reduced to freezing,	29.15, 20th, 1 P.
Reduced† maximum reading,	30.78, 29th, 10 A.
Reduced† minimum reading,	29.46, 20th, 1 P.
Mean semi-daily reduced,	30.066
Monthly range,	1.32

***Air Temperature.** In Degrees Fahr.

Highest,	71.5, 1st, 2:30 P.
Lowest,	4.5, 24th, 6 A.
Mean hourly,	37.0
Mean of means of max. and min.,	37.6
Mean sensible (wet bulb),	31.5
Monthly range,	67.0
Highest mean daily,	51.6, 4th
Lowest mean daily,	21.0, 23d
Mean maximum,	47.5
Mean minimum,	27.6
Mean daily range,	19.8
Greatest daily range,	37.5, 1st
Least daily range,	8.5, 19th

Humidity.

Mean dew point,	25.7
Mean force of vapor,	.215
Mean relative humidity,	69.6

Precipitation. In inches.

Total precipitation,	2.62
Number of days on which .01 inch or more rain fell	7
Total snow in inches	5⅜

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	5280m.
Greatest daily movement,	378m., 17th
Least daily movement,	15m., 30th
Mean daily movement,	176.m
Mean hourly velocity,	7.3 m

Maximum pressure per square foot, 18.5 lbs.= 61m. per hour, 13th, 3 P., S.S.W.

Maximum velocity for 5 minutes, 40m. per hour, 13th, 2 P., S.S.W.

Prevailing Direction, West Southwest.

Summary.

West	23 per cent.
West Southwest	13 " "
South	10 " "
South Southwest	10 " "
Southwest	10 " "
Northwest	10 " "
Other directions	24 " "

Weather.

Mean cloudiness observed,	41 per cent.
Total cloudiness recorded by the Sun Thermometer,	180 hrs.=62 per cent.
Number of clear days,	3
Number of fair days,	10
Number of cloudy days,	17

Bright Sunshine.

Number of hours recorded, 113 hrs=38%.

Rain, 2d, 3d, 5th, 7th, 8th, 13th, 15th, 16th, 19th.

Snow, 11th, 17th, 19th, 20th, 23d

Gales, 35 or more miles per hour: 45m, 2d, W.N.W.; 44m, 4th, W.S.W.; 35m, 5th, W. N. W.; 61m, 13th, S.S.W.; 37th, 14th, W.; 41m, 15th, E.S.E.; 59m, 17th, W.; 41m, 19th, N.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum.	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.04	29.77	29.931	71.5	2:30 P	34.0	5 A	52.7	51.3	40.3	7.2
2	29.84	29.64	29.745	59.0	12 M	42.5	12 P	50.7	48.8	42.3	1.6
3	29.98	29.81	29.919	58.0	2:30 P	34.0	7:30 A	46.0	45.3	39.0	7.6
4	29.85	29.56	29.765	71.0	2 P	35.0	7 A	53.0	51.6	40.5	6.2
5	29.79	29.69	29.773	56.5	11:30 A	41.0	12 P	48.7	46.6	40.7	3.5
6	30.13	29.78	29.987	49.0	1:30 P	34.0	6 A	41.5	41.1	36.3	1.1
7	30.25	29.92	30.135	48.0	1 P	36.0	6 A	42.0	42.0	37.5	5.4
8	29.92	29.78	29.867	52.5	1:30 P	38.0	7:30 A	45.3	43.9	38.7	0.1
9	30.07	29.86	30.027	41.0	1 P	29.0	12 P	35.0	34.3	28.0	6.2
10	30.12	30.02	30.095	40.0	2 P	22.0	7 A	31.0	29.1	23.3	8.1
11	30.05	29.87	29.951	51.0	3:30 P	24.0	0 A	37.5	36.0	31.7	2.3
12	30.24	30.00	30.155	48.5	2:30 P	27.0	7:30 A	37.7	37.0	30.7	2.7
13	30.24	29.74	30.003	61.0	1 P	28.5	3 A	44.7	42.8	38.0	2.2
14	30.43	30.05	30.294	48.0	3:30 P	29.0	12 P	38.5	39.6	31.7	7.0
15	30.44	29.60	30.121	54.0	12 P	25.0	6 A	39.5	36.7	36.5	0.0
16	29.87	29.47	29.633	60.5	2 A	34.0	12 P	47.3	49.3	45.0	0.0
17	30.22	29.87	30.080	37.5	12:30 P	26.5	12 P	32.0	31.3	26.0	3.0
18	30.53	30.22	30.510	29.5	1 P	19.5	6:30 A	24.5	24.9	20.0	3.6
19	30.47	29.74	30.159	34.0	9 P	25.5	0 A	29.7	28.4	28.0	0.0
20	29.74	29.46	29.551	35.5	3:30 P	25.5	9 P	30.5	30.7	27.3	0.6
21	29.86	29.59	29.776	34.5	3:30 P	22.5	11 P	28.5	27.1	20.0	3.1
22	30.07	29.86	29.977	37.5	3 P	18.0	4:30 A	27.7	28.1	23.5	0.7
23	30.50	30.07	30.333	29.5	12 M	14.0	12 P	21.7	21.0	18.0	5.5
24	30.59	30.24	30.461	36.0	2 P	4.5	6 A	20.3	21.2	16.0	7.3
25	30.24	29.92	30.055	44.0	4 P	28.0	6 A	36.0	36.6	32.3	4.3
26	29.92	29.71	29.804	53.0	2:30 P	35.5	6 A	44.3	44.2	37.7	6.0
27	30.35	29.71	30.002	52.5	11 A	32.0	12 P	42.3	45.6	38.0	0.0
28	30.69	30.35	30.626	41.5	4 P	21.5	7:30 A	31.5	29.8	21.7	8.0
29	30.78	30.64	30.705	48.5	3 P	17.5	7:30 A	33.0	30.2	24.7	8.8
30	30.67	30.41	30.533	41.5	3 P	27.5	0:30 A	34.5	34.5	32.3	1.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	32.0	.331	57.5	S.	138	2.5	22	4 P				
2	38.5	.301	78.0	W.	259	10.0	45	2 P	4 A	12 M	.12	
3	33.0	.289	67.0	W.S.W.	154	1.0	14	7 P	5 P		T	
4	35.5	.309	74.0	S.W.	229	9.5	44	4 P				
5	35.0	.301	67.5	W.	235	6.0	35	1 P	1 P	4 P	T	
6	31.5	.243	73.5	N.W.	169	2.5	22	10 A				
7	32.5	.261	71.0	W.	118	3.0	24	9 P	7 P		T	
8	36.0	.248	88.0	E.N.E.	177	4.0	28	1 A	6 P	12 P	.22	
9	20.0	.179	62.5	N.N.W.	249	4.5	30	7 A				
10	15.0	.143	62.5	N.W.	142	1.5	17	9 A				
11	29.5	.205	75.5	S.W.	70	0.5	10	3 P	5 A		T	T
12	24.5	.197	67.5	W.S.W.	156	3.0	24	12 M				
13	33.0	.279	72.5	S.S.W.	228	18.5	61	3 P	6 P	7 P	.02	
14	21.0	.221	53 0	N.W.	258	7.0	37	1 A				
15	33.5	.240	84.0	E.	70	8.5	41	9 P	1 P	12 P	.88	
16	40.0	.358	75.0	W.	323	5.5	33	5 P	0 A	10 A	.63	
17	17.5	.163	60.5	W.	378	17 5	59	1 P	4 P		T	T
18	10.0	.127	56.0	W.S.W.	195	3.0	24	3 A				
19	25.0	.163	83.0	N.N.E.	127	8.5	41	12 P	8 A	12 P	.67	*4.25
20	24.0	.157	85.5	N.N.W.	192	5.5	33	1 A	0 A	10 A	.08	1.5
21	5 5	.129	50.5	W.S.W.	162	2.5	22	0 A				
22	19.0	.155	46.5	S.W.	195	4.0	28	12 M				
23	12.5	.111	71.5	N.W.	187	4.5	30	2 P	11 A	12 M	T	T
24	10.5	.109	73.0	S.	122	5.0	32	9 P				
25	25.5	.215	67.0	S.S.W.	203	3.0	24	9 A				
26	31.0	.273	63 0	S.S.W.	203	3.0	24	10 P				
27	32.5	.270	68.5	W.	227	4.5	30	8 P				
28	13.5	.135	63.0	N.	77	0.0	—	—				
29	22.0	.147	79.5	E.	22	0.5	10	1 P				
30	31.0	.193	92.5	S.	15	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was generally seasonable and presented few unusual features of interest. Nearly all the precipitation occured near the middle of the month and the wind movement was most marked at about the same time. A snowfall of nearly six inches on the 19th, 20th, was the last precipitation of any importance and traces of it remained on the ground when the month closed. During the last week of the month some rather low temperatures were registered.

A study of the separate records of the several weather elements shows the following features: The mean barometer was slightly higher than the normal and the range of pressure nearly the average amount for November. The maximum barometer, on the 29th, was the highest November record since 1896. The maximum pressure was also much higher than the normal value for that feature.

The total wind movement was considerably more than usual and a comparatively large number of gales was registered.

The mean temperature was about two and one-half degrees below the normal, owing largely to the low temperatures for a few days near the end of the month. The maximum temperature was considerably higher than usual while the minimum was the lowest November record since 1891, giving a range about one-third more than usual. The mean hourly temperatures for the 23d and 24th were extremely low for the time of year.

The mean dew point and relative humidity were both several points lower than the normal values for these elements.

The total precipitation was about five-sixths of the normal and nearly all of it occurred during two well defined storms.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 312. DECEMBER, 1914

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.36, 26th, 11 P.
Minimum reduced to freezing,	28.86, 14th, 5 A.
Reduced† maximum reading,	30.69, 26th, 11 P.
Reduced† minimum reading,	29.17, 14th, 5 A.
Mean semi-daily reduced,	30.177
Monthly range,	1.52

***Air Temperature.** In Degrees Fahr.

Highest,	58.5, 3d, 2 P.
Lowest,	-18.5, 27th, 6 A.
Mean hourly,	24.2
Mean of means of max. and min.,	24.7
Mean sensible (wet bulb),	20 7
Monthly range,	77.0
Highest mean daily,	47.5, 3d
Lowest mean daily,	-6.0, 27th
Mean maximum,	33.2
Mean minimum,	16.2
Mean daily range,	17.0
Greatest daily range,	30.5, 28th
Least daily range,	3.5, 9th

Humidity.

Mean dew point,	14.5
Mean force of vapor,	.140
Mean relative humidity,	73.2

Precipitation. In inches.

Total precipitation,	2.89
Number of days on which .01 inch or more rain fell	8
Total snow in inches	5.5

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	4705m.
Greatest daily movement,	425m., 22d
Least daily movement,	1m., 28th
Mean daily movement,	152 m
Mean hourly velocity,	6.3 m

Maximum pressure per square foot, 12.0 lbs.= 49m. per hour, 21st, 8 P., W.N.W.

Maximum velocity for 5 minutes, 36m. per hour, 30th, 5 P., N.W.

Prevailing Direction, West Northwest.

Summary.

North Northeast	26 per cent.
West	16 " "
North	10 " "
West Southwest	10 " "
North Northwest	10 " "
Other directions	28 " "

Weather.

Mean cloudiness observed,	54 per cent.
Total cloudiness recorded by the Sun Thermometer,	123 hrs.=43 per cent.
Number of clear days,	11
Number of fair days,	10
Number of cloudy days,	10

Bright Sunshine.

Number of hours recorded, 160 hrs=57%.

Rain, 7th, 8th, 13th, 14th, 19th, 20th, 29th.

Snow, 7th, 10th, 13th, 14th, 19th, 20th, 22d, 23d, 24th, 27th.

Days of Sleighing, 11.

Gales, 35 or more miles per hour: 38m, 7th, N.N.E.; 45m, 14th, W.N.W.; 38m, 15th, W.S.W.; 39m, 20th, N.W.; 49m, 21st, W.N.W.; 42m, 22d, N.W.; 45m, 30th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.41	30.24	30.299	57.0	3 P	31.0	2 A	44 0	40.1	37.0	5.9
2	30.24	30 07	30.145	50.0	10 P	31.5	2 A	40.7	40.9	40.7	0.1
3	30.34	30.07	30.197	58.5	2 P	37.0	12 P	47.7	47 5	43.5	6.4
4	30.49	30.34	30 465	46.5	3:30 P	33.0	7 A	39.7	36.3	30.7	6.4
5	30.56	30.46	30.565	37.0	12 M	26.0	12 P	31.5	30.3	24.3	5.2
6	30.54	30.37	30 489	33 5	9 P	26.0	0 A	29 7	30.6	27.3	0.0
7	30.37	29.86	30.065	32.0	12 M	29.5	5 A	30.7	30 8	29.7	0.0
8	30.07	29.80	29.921	35 5	4 P	30.0	1 A	32.7	32 8	28.5	0.0
9	30.26	30.07	30.219	30.0	3:30 P	26.5	9 A	28.3	28.3	24.7	1.7
10	30.18	29.98	30.055	37.5	3:30 P	25.0	8 A	31.3	28.7	25.0	7.5
11	30.11	29.98	30.055	39.0	2 P	24.0	12 P	31.5	30.0	27.5	7.3
12	30.24	30.11	30.216	38.0	2 P	20.0	12 P	29.0	25.8	21.3	8.3
13	30.28	29 34	29.989	38.0	12 P	14.5	6:30 A	26.3	25.4	24.3	2.2
14	29.78	29 17	29.521	39.0	1 A	18 0	12 P	28.5	30.9	25.0	1.6
15	30.20	29.78	30.049	22.5	2 P	12.0	7:30 A	17.3	17.3	13 0	7.8
16	30.42	30.20	30.395	28.5	1:30 P	15.0	12 P	21.7	20 0	16.5	7.4
17	30.51	30.40	30.496	28.5	3:30 P	13.0	7:30 A	20.7	17.8	13.3	8.3
18	30.51	30.41	30.471	30.0	3:30 P	5.5	7:30 A	17.7	16.7	16.5	8.4
19	30.41	29.91	30.121	37.0	8 P	14.0	3 A	25 5	27.1	26.5	1.8
20	30.41	29.91	30.298	39.0	1:30 A	23.0	12 P	31.0	30.5	25.5	8.5
21	30 39	29.63	29.909	35 5	7:30 P	21.5	9:30 A	28.5	25.4	25.3	0.3
22	29.91	29.75	29.874	28.5	12 M	16.0	12 P	22.3	23.0	18.0	8.2
23	30.20	29.91	30.056	20.5	1:30 P	5.0	6 A	12.7	13.2	8.3	6.8
24	30.26	29.91	30.090	20.0	10 P	−0.5	7 A	9.7	12.1	9.7	5.3
25	30.23	29.90	30.151	15.0	1:30 P	2 0	12 P	8.5	10.3	6.7	6.5
26	30.69	30.23	30.537	13.5	3 P	−16.0	7:30 A	−1.3	−4 5	−12.0	8.5
27	30.67	30.30	30.438	9.0	3 P	−18.5	6 A	−4.7	−6 0	−10.0	7.9
28	30.45	30.29	30.383	25.5	2 P	−5.0	1:30 A	10.3	10.2	7.7	6.5
29	30.29	29.56	29.913	31.0	12 P	8.0	3:30 A	19.5	27.1	23.3	1.2
30	30.11	29.51	29 787	43.0	12:30 P	22.5	12 P	32.7	33.8	30.5	6 7
31	30.37	30.11	30.328	30.0	4 P	12.0	12 P	21.0	19.3	14.7	7.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	35.5	.229	93.5	S.	21	0.5	10	12 M				
2	38.5	.273	90.0	W.S.W.	24	0.0	—	—				
3	41.0	.307	86.0	N.N.W.	99	2.5	22	2 P				
4	24.0	.201	65.5	N.	262	3.5	26	8 A				
5	16.0	.151	63 0	N.N.E.	206	1.5	17	9 A				
6	21.5	.167	71.0	N.N.E.	293	3.0	24	1 P				
7	27.5	.171	90.0	N.N.E.	382	7.0	38	9 P	11 A	12 P	.43	1.0
8	20.0	.185	61 0	N.N.E.	232	4.5	30	1 A	0 A	10 A	.14	
9	19.0	.149	71.5	N.N.E.	168	0.5	10	4 P				
10	21.5	.143	85.0	N.	144	1.5	17	8 A	7 A	10 P	T	T
11	23.5	.159	83.5	N.W.	55	1.5	17	4 P				
12	17.0	.177	77.5	N.	56	0.0	—	—				
13	22.5	.144	90 0	N.N.E.	32	2.0	20	7 P	4 P	12 P	.55	.25
14	17.0	.161	62.0	W.	350	10.0	45	5:30P	0 A	12:30P	.55	T
15	4.0	.090	62.0	W.S.W.	346	7.0	38	12 M				
16	6.5	.106	60.0	W.S.W.	181	3.5	26	4 P				
17	5.0	.089	62.5	N.N.E.	59	1.0	10	1 P				
18	4.0	.086	68.0	W.	27	0.0	—	—				
19	24.0	.163	83.5	S.S.W.	122	2.0	20	12 P	4 P	9 P	.16	T
20	22.0	.147	82.5	N.W.	270	7 5	39	4 P	3 A	4 P	.72	3.5
21	18.0	.158	67.0	N.N.W.	76	12.0	49	8 P				
22	9.0	.113	59.0	W.N.W.	425	9.0	42	2 A	11 P		T	T
23	0.5	.073	63.5	W.	185	2.0	20	1 P	2 P	6 P	T	T
24	5.0	.078	79.0	S.W.	79	0.5	10	4 P	2:30P	11 P	.04	.75
25	2.0	.064	77.5	E.	114	3.5	26	10 A				
26	−24.0	.027	52.5	N.E.	33	0.0	—	—				
27	−27.0	.032	52.0	W.	10	0.0	—	—	9 A	1 P	T	T
28	0.0	.075	67.5	S.S.W.	1	0.0	—	—				
29	21.5	.132	92.0	N.W.	47	0.5	10	12 P	10 A	10 P	.30	
30	25.0	.187	76.0	W.	288	10.0	45	5 P				
31	9.0	.093	74.0	N.N.E.	118	1.5	17	5 A				

**Rain or melted snow at base of tower. *Included in following day.

Annual Summary for 1914.

Pressure. In inches.

Maximum reduced to freezing, ... 30.47, Nov. 29th, 10 A.
Minimum reduced to freezing, ... 28.17. Mar. 1st, 8 P.
Maximum reduced to freezing and sea-level, ... 30.78, Nov. 29th, 10 A.
Minimum reduced to freezing and sea-level, ... 28.47, Mar. 1st, 8 P.
Mean reduced to freezing and sea-level, ... 30.048
Annual range, ... 2.31

***Air Temperature.** In degrees Fahr.

Highest, ... 96.5, Sept. 22d, 3:30P.
Lowest, ... —18.5, Dec. 27th, 6 A.
Mean hourly, ... 45.8
Mean of means of max. and min., ... 46.3
Mean sensible (wet bulb), ... 41.4
Annual range, ... 115.0
Highest mean daily, ... 79.7, Aug. 10
Lowest mean daily, ... —7.3, Jan. 13
Mean maximum, ... 56.9
Mean minimum, ... 35.7
Mean daily range, ... 21.2
Greatest daily range, ... 50.5, Oct. 3
Least daily range, ... 3.0, Mar. 16

Humidity.

Mean dew point, ... 36.6
Mean force of vapor, ...368
Mean relative humidity, ... 75.8

Wind.

Prevailing direction, ... West Northwest

Summary.

North Northeast, ... 11 per cent.
North, ... 11 " "
North Northwest, ... 10 " "
Other directions, ... 68 " "
Total movement, ... 55,455 m
Greatest daily movement, ... 488 m., Jan. 13
Least daily movement, ... 1 m., Dec. 28
Mean daily movement, ... 152 m
Mean hourly velocity, ... 6.3 m
Maximum pressure per square foot, 30.0 lbs.=77 m. per hour, Mar. 1, 6 P., E.
Maximum velocity for 5 minutes, 45 m. per hour, Mar. 1, 6 P., E.; Apr. 12, 5 P., W.

Precipitation. In inches.

Total precipitation, rain or melted snow, . 41.83
Number of days on which .01 or more rain or melted snow fell, ... 118
Snow total in inches, ... 56.75

Weather.

Mean cloudiness observed, ... 50 per cent.
Total cloudiness recorded by Sun Thermometer, ... 2077 hrs.=47 per cent.
Number of clear days, ... 100
Number of fair days, ... 139
Number of cloudy days, ... 126

Bright Sunshine.

Number of hours recorded, 2377 hrs.=53 per cent.

Dates of Frosts.

Last, ... May 16th
First, ... Sept. 28th

Dates of Snow.

Last, ... April 16th
First, ... Oct. 27th
Total days of sleighing, ... 43

Gales of 50 or More Miles Per Hour.

Jan. 12th, 63m., W.N.W.; Feb. 14th, 50m., N.N.W.; Mar. 1st, 77m., E.; 19th, 52m., W.N.W.; Apr. 11th, 51m, S.; 12th, 73m, W.; May 23d, 54m, N.W.; 27th, 62m, W.; June 15th, 53m, S.; Aug. 21st, 58m, N.N.W. Nov. 13th, 61m, S.S.W.; 17th, 59m, W.

*Temperature in ground shelter.

R. E. McLAIN,
Observer.

J. E. OSTRANDER,
Meteorologist.

BULLETIN No. 313. JANUARY, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30 24, 24th, 10A.	
Minimum reduced to freezing, 29.00, 19th, 6 A.	
Reduced† maximum reading, 30.56, 24th, 10 A.	
Reduced† minimum reading, 29.30, 19th, 6 A.	
Mean semi-daily reduced,	30.123
Monthly range,	1.26

***Air Temperature.** In Degrees Fahr.

Highest,	54.0, 7th, 1:30 P.
Lowest,	-4.0, 5th, 8 A
Mean hourly,	26.2
Mean of means of max. and min.,	27.1
Mean sensible (wet bulb),	24.5
Monthly range,	58.0
Highest mean daily,	45.4, 7th
Lowest mean daily,	7.8, 30th
Mean maximum,	35.2
Mean minimum,	19.0
Mean daily range,	16.2
Greatest daily range,	41.0, 5th
Least daily range,	7.0, 24th

Humidity.

Mean dew point,	19.1
Mean force of vapor,	.147
Mean relative humidity,	80.8

Precipitation. In inches.

Total precipitation,	6.52
Number of days on which .01 inch or more rain fell	12
Total snow in inches	11.5

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	3986m.
Greatest daily movement,	490m., 13th
Least daily movement,	1m., 4th
Mean daily movement,	129 m
Mean hourly velocity,	5.3 m

Maximum pressure per square foot, 12.5 lbs.= 50m. per hour, 13th, 7 A., N.

Maximum velocity for 5 minutes, 30m. per hour, 7th, 6A., S.S-W.; 13th, 6A., N.; 19th, 6A., S.S.W.

Prevailing Direction, West Northwest.

Summary.

West	19 per cent.
North	16 " "
North Northwest	16 " "
Northwest	13 " "
South	10 " "
Other directions	26 " "

Weather.

Mean cloudiness observed,	51 per cent.
Total cloudiness recorded by the Sun Thermometer,	150 hrs.=51 per cent.
Number of clear days,	11
Number of fair days,	9
Number of cloudy days,	11

Bright Sunshine.

Number of hours recorded, 144 hrs=49%.

Rain, 6th, 7th, 12th, 13th, 17th, 18th, 19th, 23d, 25th, 31st.

Snow, 2d, 12th, 13th, 17th, 20th, 23d, 24th, 25th, 27th, 28th, 31st.

Hail, 17th.

Days of Sleighing, 13.

Gales, 35 or more miles per hour: 49m, 7th, S.S W; 43m, 12th, N.; 50m, 13th, N.; 43m, 19th, S.S.W.; 36m, 24th, W. N. W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.46	30.13	30.371	30.5	3:30 P	0.0	8 A	15.3	12.6	7.5	8.2
2	30.13	29.89	30.009	28.0	3 P	14 5	0 A	21.3	21.7	20.3	0.0
3	30.39	29.94	30.289	28.5	2:30 P	7.0	12 P	17.7	19.3	15.3	8.0
4	30.44	30.35	30.425	28.5	3:30 P	−2.5	4:30 A	13.0	8.5	3.7	7.3
5	30.49	30.30	30.410	37.0	3:30 P	−4.0	8 A	16.5	15 5	12.5	8.0
6	30.30	29.85	30 139	41.0	4 P	28.0	2 A	34.5	34.0	32.5	5.6
7	29.86	29.49	29.646	54.0	1:30 P	34.0	0:30 A	44.0	45.4	42.0	8.1
8	30.16	29.86	30.029	37.5	12 M	29.5	12 P	33 5	32.8	28.5	0.8
9	30.27	30 17	30.233	35 0	3 P	22.0	12 P	28.5	28.0	24.0	8.7
10	30.40	30.15	30.382	35.0	3 P	16.5	7:30 A	25.7	23 7	18.7	8.7
11	30.40	30.12	30.283	32.0	3:30 P	11.5	7:30 A	21.7	21.2	19 5	5.5
12	30.12	29.48	29 785	37.0	8 P	26.0	0 A	31.5	32.4	33.5	0.0
13	30.01	29.39	29.732	42.0	2:30 P	28.0	12 P	35.0	35.7	31.3	4.9
14	30.17	30.01	30.079	38.0	3 P	19.5	7 A	28.7	28.7	25.5	8.6
15	30.17	29.97	30.045	41.5	3:30 P	32.0	8 A	36.7	34.1	32.3	3.7
16	30 37	30.17	30.350	44.0	3 P	23.5	7:30 A	33.7	32 0	26 5	7.7
17	30.35	29.94	30.143	38.0	9 P	28 0	4:30 A	33.0	34.0	33 0	0.0
18	29.94	29.43	29 703	45.0	11 P	34.0	3 A	39.5	36.2	36.0	0 0
19	29 44	29.30	29.414	54.0	8 A	34.0	12 P	44 0	45 0	43.3	0.1
20	29 83	29 54	29.741	37 5	3 P	29 5	6 A	33 5	31.0	27.5	3 9
21	30.21	29 84	30.055	33.5	1:30 P	21.0	12 P	27.3	26 0	21.5	7.6
22	30.48	30 21	30.446	24.5	3 P	16.5	8 A	20.5	18.6	14.7	8.3
23	30.44	29.98	30.135	41.5	8:30 P	17.0	1 A	29.3	25.3	28.7	0 6
24	30.56	30.22	30.496	30.0	0 A	23.0	7:30 A	26.5	25.3	23.5	6.0
25	30.40	29.77	29.916	31.0	11 P	23 0	6 A	27.0	26.7	26.3	0.0
26	30.34	30.01	30.289	37 0	4:30 P	20.5	11:30 P	28.7	27.7	21.0	8.5
27	30.35	30.16	30.219	30 5	4 P	21.0	0 A	25 7	26.5	25.7	0.3
28	30.16	29.89	29.993	36.0	3:30 P	27.0	12 P	31.5	30 4	29.3	2.5
29	30.28	29.96	30.191	27.0	0 A	9 0	12 P	18.0	14.3	9.0	4.5
30	30.52	30.28	30.499	20.5	3 P	−1.5	7:30 A	9.5	7.8	1.5	7.8
31	30.55	30.01	30.368	17.0	12 P	2.5	6:30 A	9.7	10.7	10.3	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	4.0	.069	83.0	N.N.E.	5	0.0	—	—				
2	17.5	.116	86.0	S.	38	3.0	24	11 P	10 A	4 P	.12	1.25
3	10.0	.096	74.5	N.W.	203	5.0	32	11 A				
4	*1.5	.056	89.5	N.N.W.	1	0.0	—	—				
5	9 5	.072	84.5	W.	87	4.0	28	4 P				
6	30.5	.191	91.0	S.	142	3.0	24	1 A	11 P	12 P	.02	
7	38.5	.294	82.0	S.S.W.	249	12.0	49	7 A	0 A	6:30A	.95	
8	21.0	.181	63.0	W.	270	4.5	30	6 P				
9	18.5	.143	74.0	N.W.	131	1.5	17	1 A				
10	13.5	.112	74.5	N.	89	1.0	14	11 A				
11	16.0	.117	83.5	W.	36	1.0	14	3 P				
12	33 0	.196	95.5	N.N.W.	145	9.0	43	11 P	5 A	12 P	1.31	T
13	24.5	.199	69.0	N.	490	12.5	50	7 A	0 A	8 A	.28	T
14	23 0	.149	88.0	W.	95	1.0	14	8 P				
15	31.0	.187	92.5	S.E.	46	0.0	—	—				
16	23.5	.154	83.5	N.N.W.	73	1.0	14	12 M				
17	30 5	.199	87.5	S.E.	92	2.5	22	9 A	10 A	12 P	.62	T
18	35.0	.212	97.5	S.	12	0.0	—	—	0 A	12 P	1.46	
19	40.5	.317	83.5	W.S.W.	243	9.0	43	6 A	0 A	8 A	.04	
20	22.5	.163	79.5	W.N.W.	129	2 5	22	5 A	10 A	12 M	T	T
21	18.0	.125	81.0	W.N.W.	106	4.0	28	5 P				
22	6.0	.097	65.0	N.W.	194	3 5	26	10 A				
23	28.0	.175	98.0	S.W.	101	5.5	33	9 P	0 A	9 P	.84	4.5
24	21.0	.133	84.5	N.W.	194	6.5	36	2 A	11 P	12 P	T	T
25	24.5	.146	94 5	N.N.W.	178	2.5	22	11 P	0 A	11 A	.35	2.0
26	11.0	.130	60.0	N.N.W.	123	2.0	20	2 A				
27	23.0	.146	86 0	N.	97	1.0	14	5 P	12 M	1 P	T	T
28	27.0	.167	92.0	N.	58	2 5	22	9 P	8 A	10 P	.11	1.25
29	−4.5	.076	50.0	W.	233	5.5	33	3 A				
30	−13.0	.055	44.5	N.	101	1.0	14	2 P				
31	8.5	.075	88.0	W.	25	0.0	—	—	11 A	12 P	.42	2.5

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The most noticeable feature of the weather for January was the unusually large precipitation, the greater part of which occurred as rain. The total snowfall was nearly one foot and nearly all of it occurred during the latter part of the month. The total precipitation was the largest January record since 1898.

The first five days and the last five days of the month were periods of low temperature, while the intervening period was generally warmer than the average for the month. The mean temperature for the month was two degrees higher than that of the preceding month, although the normal for January is more than three degrees lower than for December.

The records of the several weather elements show the following features of interest: The mean barometer was considerably higher than the normal while the range was comparatively small. The maximum pressure was below 30 inches on only four days, although the maximum for the month was much lower than the normal. The range of pressure was about eight-tenths of the usual amount and changes in pressure were generally slow. The total wind movement was about one thousand miles less than the normal and very few days had a large wind movement.

The mean temperature was one and one-half degrees higher than the normal, and the maximum and minimum were both about three degrees above their normals. The minimum temperature fell below zero on three days, but the total period for the month showing a temperature below zero was only nine hours.

The mean dew point and relative humidity were both comparatively high.

The total precipitation was about three inches more than the normal and was well distributed throughout the month. Several of the heavy storms were both snow and rain.

The amount of sunshine recorded was above the average.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 314. FEBRUARY, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30 26, 19th, 8A.
Minimum reduced to freezing,	28.96, 25th, 2 P.
Reduced† maximum reading,	30.58, 19th, 8 A.
Reduced† minimum reading,	29.27, 25th, 2 P.
Mean semi-daily reduced,	30.120
Monthly range,	1.31

***Air Temperature.** In Degrees Fahr.

Highest,	51.0, 24th, 11 P.
Lowest,	2.0, 5th, 7:30 A.
Mean hourly,	28.0
Mean of means of max. and min.,	28.9
Mean sensible (wet bulb),	25 3
Monthly range,	49.0
Highest mean daily,	42.3, 25th
Lowest mean daily,	10.0, 2d
Mean maximum,	37.4
Mean minimum,	20.3
Mean daily range,	17.1
Greatest daily range,	34.5, 11th
Least daily range,	7.0, 2d, 16th

Humidity.

Mean dew point,	21.2
Mean force of vapor,	.159
Mean relative humidity,	78.9

Precipitation. In inches.

Total precipitation,	7.02
Number of days on which .01 inch or more rain fell	12
Total snow in inches	6.5

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	4341m.
Greatest daily movement,	442m., 26th
Least daily movement,	5m., 22d
Mean daily movement,	155 m
Mean hourly velocity,	6.5 m
Maximum pressure per square foot,	9.0 lbs.= 42m. per hour, 18th, 3 P., N.
Maximum velocity for 5 minutes,	27m. per hour, 27th, 3P., W.N.W.
Prevailing Direction,	Northwest.

Summary.

North	18 per cent.
South Southwest	14 " "
North Northwest	14 " "
Northwest	11 " "
West	11 " "
Other directions	32 " "

Weather.

Mean cloudiness observed,	51 per cent.
Total cloudiness recorded by the Sun Thermometer,	181 hrs.=61 per cent.
Number of clear days,	9
Number of fair days,	4
Number of cloudy days,	15

Bright Sunshine.

Number of hours recorded, . . 115 hrs=39%.

Rain, 1st, 5th, 6th, 7th, 15th, 16th, 23d, 24th, 25th.

Snow, 1st, 2d, 3d, 5th,7th, 8th.

Hail, 1st, 2d.

Days of Sleighing, 19.

Gales, 35 or more miles per hour: 35m, 11th, S.S.E.; 42m, 18th, N.; 39m, 26th, W.; 41m, 27th, W. N. W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.29	29.88	30.065	32.5	2:30 P	15.0	12 P	23.7	23.1	21.7	0.0
2	30.33	29.96	30.141	15.0	0 A	8.0	11 A	11.5	10.0	9.3	0.0
3	30.15	29.90	30.006	20.0	2 P	11.0	0 A	15.5	15.7	15.3	0.0
4	30.33	30.15	30.289	34.5	4 P	12.0	12 P	23.3	20.2	15.7	8.4
5	30.33	30 03	30.225	30 5	12 P	2.0	7:30 A	16.3	18.2	17.0	0.7
6	30.03	29.76	29.791	46.5	3:30 P	30 5	0 A	38.5	38.3	38.7	0.3
7	29.88	29.71	29 782	42.5	3:30 P	29.0	7:30 A	35.7	34.5	31.0	2.2
8	29.96	29.71	29 843	36.0	1:30 P	23.5	11:30 P	29 7	30 0	26.3	3.0
9	30.30	29.96	30.150	30.0	2 P	15.5	12 P	22.7	22.6	18.0	6.3
10	30.54	30.30	30.489	28.0	5 P	6.5	7:30 A	17.3	14.5	12.3	8.5
11	30.54	30.18	30 398	38 5	2:30 P	4.0	7:30 A	21.3	23.2	19.0	4.4
12	30.28	29.98	30.125	44.5	4:30 P	30.0	12 P	37.3	37.8	32 0	0.3
13	30.45	30.28	30.423	41.0	2:30 P	20 0	7:30 A	30 5	27 6	24 3	8.9
14	29.43	30.31	30.377	37.5	9 P	20.0	3 A	28.7	29.0	29.3	0.0
15	30 31	30.10	30.159	42.5	6:30 P	33.0	4:30 A	37.7	35.7	36 0	0 0
16	30.20	30.11	30.181	38 5	3 P	31.5	12 P	35.0	35.5	31.5	0.0
17	30.37	30.09	30.293	35 0	4 P	22.0	12 P	28.5	29.8	26.5	8.7
18	30.49	30.37	30.453	32.0	3 P	16.5	6:30 A	24.3	23 7	20.5	9.1
19	30.58	30.44	30.523	42.0	3:30 P	19.0	6:30 A	30 5	28.2	23.0	9.3
20	30.44	30.34	30.398	49.0	4:30 P	24.5	6 A	36.7	34.6	29.0	9.2
21	30.43	30.33	30 378	46.0	3:30 P	22.0	7:30 A	34 0	32.6	27 5	9 1
22	30.37	30.22	30.303	47.0	4:30 P	20.0	7:30 A	33.5	31.2	28.5	7.8
23	30.22	30.13	30.182	45.0	9 P	35.0	7 A	40.0	38.7	36.7	1.5
24	30.13	29.66	29 861	51.0	11 P	35.0	4 A	43.0	40 8	41.5	0 0
25	29.66	29 27	29.369	50.0	3:30 A	37.0	12 P	43.5	42.3	41.0	0.0
26	29.72	29.38	29.614	37.0	0 A	15.5	12 P	26.3	24.7	21.7	0 0
27	29.83	29.72	29.756	26.0	3 P	14.0	5:30 A	20.0	19 0	16.5	8.5
28	29.82	29.75	29.785	29.5	3:30 P	17.5	3 A	23 5	22.3	20.0	8.9

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	18.5	.125	83.5	N.N.W.	111	4.5	30	7 P	0 A	12 P	.86	0.5
2	7.0	.070	87.5	N.N.E.	306	3.0	24	6 A	0 A	12 P	.34	3.0
3	13.0	.092	87.0	N.	171	3.0	24	11 P	0 A	12 P	1.05	2.25
4	13 5	.095	87.0	N.N.W.	127	1.0	14	2 A				
5	17.0	.110	100.0	S.S.W.	41	2.0	20	2 P	4 P	12 P	.19	T
6	36.0	.253	74.5	S.	64	1.0	14	8 P	0 A	1 P	.31	
7	28.5	.183	88.0	S.S.W.	34	0.0	—	—	7 P	12 P	.15	0.5
8	22.5	.152	83.0	N.W.	113	1.0	14	11 A	0 A	8 A	.05	0.25
9	14.0	.107	77.5	N.W.	146	4.5	30	3 P				
10	9.0	.083	81.5	N.	120	3.5	26	4 A				
11	13.5	.131	73.0	S.S.E.	166	6.0	35	9 P				
12	28.0	.207	75.0	W.	219	4.0	28	7 P				
13	20.5	.142	79.5	N.	130	0.5	10	8 P				
14	26.5	.175	84.5	W.	20	0.5	10	3 P				
15	35.0	.213	97.5	S.	24	0.0	—	—	1 A	12 P	.91	
16	25.0	.206	65.5	N.W.	147	2.0	20	2 P	0 A	5 A	.07	
17	22.0	.159	75.0	N.N.W.	209	4.0	28	1 P				
18	14.0	.125	68.5	N.	290	9.0	42	3 P				
19	14.0	.149	59 5	N.N.W.	230	2.0	20	5 A				
20	19.5	.191	63.5	N.	211	3.0	24	9 A				
21	21.5	.169	69.0	N.N.E.	42	0 0	—	—				
22	24.5	.179	77.5	N.E.	5	0.0	—	—				
23	33.0	.239	81.5	S.S.W.	36	0.0	—	—	10 P	12 P	.02	
24	39.5	.289	87.0	S.S.W.	34	2.0	22	7 P	0 A	12 P	.88	
25	39 5	.273	89.0	W.S.W	143	4.5	30	12 P	0 A	10 P	2.19	
26	16.0	.121	78.0	W.	442	7.5	39	6 A				
27	8.5	.105	67.0	W.N.W.	424	8.5	41	3 P				
28	13.5	.120	70.5	W.N.W.	336	5.0	32	3 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The most noticeable features of the weather for the month were the large precipitation and absence of extreme cold. No zero weather occurred, and only three dates showed a minimum temperature lower than ten degrees above zero. The large precipitation record was accompanied by a correspondingly small sunshine record.

The records of the several weather elements show the following as the more important features. The mean barometer was considerably higher than the normal and the range considerably less than usual at this time of year. Owing to the comparatively steady barometer the total wind movement was rather small, and the few gales recorded were only of moderate intensity. The maximum pressure was nearly normal.

The mean temperature was about four degrees higher than the February normal, making the record the highest since 1909. The maximum temperature was nearly normal, while the minimum was more than ten degrees higher than usual, giving a comparatively small range. The first half the month was considerably colder than the last half.

The mean dewpoint was about four degrees higher than the normal and the relative humidity a little above the average.

The total precipitation was more than twice the normal and the largest February record since 1900. Several heavy storms occurred, but the one of the 24th—25th was much the largest—more than three inches of rain being registered. The snowfall was not large, and practically all of it occurred during the first week of the month.

The total wind movement was about ten per cent less than usual.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 315. MARCH, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.02, 5th, 8 A.
Minimum reduced to freezing,	29.21, 21st, 2 P.
Reduced† maximum reading,	30.37, 5th, 8 A.
Reduced† minimum reading,	29.52, 21st, 2 P.
Mean semi-daily reduced,	29.832
Monthly range,	0.85

***Air Temperature.** In Degrees Fahr.

Highest,	57.5, 25th, 4 P.
Lowest,	13.0, 3d, 12 P.
Mean hourly,	32.0
Mean of means of max. and min.,	32.8
Mean sensible (wet bulb),	27.3
Monthly range,	44.5
Highest mean daily,	43.8, 25th
Lowest mean daily,	19.5, 3d
Mean maximum,	43.0
Mean minimum,	22.6
Mean daily range,	20.3
Greatest daily range,	31.0, 4th
Least daily range,	12.0, 7th

Humidity.

Mean dew point,	20.0
Mean force of vapor,	.175
Mean relative humidity,	65.4

Precipitation. In inches.

Total precipitation,	0.12
Number of days on which .01 inch or more rain fell	3
Total snow in inches	0.5

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	6864m.
Greatest daily movement,	555m., 3d
Least daily movement,	63m., 23d
Mean daily movement,	221m.
Mean hourly velocity,	9.2 m.

Maximum pressure per square foot, 16.0 lbs.= 57m. per hour, 26th, 12M., W.

Maximum velocity for 5 minutes, 36m. per hour, 26th, 12M., W.

Prevailing Direction, Northwest.

Summary.

Northwest	32 per cent.
North Northwest	23 " "
West Northwest	19 " "
West	19 " "
Other directions	7 " "

Weather.

Mean cloudiness observed,	27 per cent.
Total cloudiness recorded by the Sun Thermometer,	81 hrs.=22 per cent.
Number of clear days,	17
Number of fair days,	13
Number of cloudy days,	1

Bright Sunshine.

Number of hours recorded, 290 hrs=78%.

Rain, 21st, 22d, 25th.

Snow, 2d, 22d, 23d, 26th, 29th, 30th.

Gales, 35 or more miles per hour: 35m., 1st, W.N W.; 40m., 2d, W.N.W.; 40m , 3d, W.N.W.; 37m., 4th, N.N.W.; 36m., 10th, W.N.W.; 35m., 11th, N.W.; 39m., 14th, N.N.W.; 39m., 15th, W.N.W.; 57m , 26th, W.; 44m., 27th, N.W.; 36m., 29th, W.N.W.; 41m., 30th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.81	29.71	29 757	33.0	4:30 P	17.0	2 A	25.0	24.5	20.5	9.6
2	29.77	29.67	29.723	38.5	3 P	24.0	3:30 A	31.3	30.9	29.7	4.6
3	30.13	29.75	29.965	26.0	0 A	13.0	12 P	19.5	19.5	16.3	9.4
4	30.32	30.13	30.295	44.0	3:30 P	13.0	0 A	28.5	27.5	23.3	10.6
5	30.37	30.18	30.287	44.0	4 P	20.5	7 A	32.3	31.5	27.0	9.7
6	30.18	29.84	30.012	42.5	3 P	26.5	6 A	34 5	33.8	30.7	7.0
7	29.84	29.66	29.739	44.0	2:30 P	32.0	6 A	38.0	36.1	29.7	6.9
8	29.85	29 69	29.789	42.0	4 P	25.0	12 P	33.5	32.7	26.5	9 1
9	29.87	29.76	29.849	43.0	3:30 P	20.0	7 A	31.5	30.6	25.0	10 6
10	29.84	29 61	29.708	43.0	3 P	25.0	6:30 A	34.0	32.7	27.7	9.3
11	29.79	29 67	29.721	43 0	3 P	27.5	6 A	35.3	34.3	29.7	10 2
12	30 08	29 79	29.972	39.0	4 P	22.5	7 A	30.7	29.3	22.3	11.2
13	30.10	29 90	30.010	48.0	4 P	18.5	7 A	33.3	32.7	27.7	11.4
14	29.95	29.82	29.898	44.5	3:30 P	22.5	7 A	33.5	32 9	27.0	11.4
15	29.88	29.62	29.717	42.5	3:30 P	20.5	3:30 A	31 5	30.8	26.3	11.5
16	29.70	29.59	29 657	45.0	3 P	20.0	7 A	32.5	32.0	25.7	11.5
17	29.71	29.58	29 677	40.0	2 P	22.0	7 A	31.0	29.3	26 3	7.4
18	29.84	29 71	29.803	38.0	4 P	21.0	6 A	29.5	28.1	23.5	10.4
19	29.83	29 70	29.779	47.0	3:30 P	19.5	6:30 A	33.3	32.5	28.0	11.8
20	29.72	29.59	29.671	46.5	3 P	22 5	6:30 A	34 5	34.2	27.5	11.8
21	29.62	29.52	29.561	42.5	3:30 P	27.5	3 A	35.0	35.1	32.5	3.6
22	29.65	29.58	29.645	46.0	12:30 P	28.5	7 A	37 3	37.5	34.5	5.8
23	29.72	29.60	29.668	51 5	5 P	32.0	7:30 A	41.7	38.3	33.3	8.0
24	29.82	29.69	29.779	54.5	2:30 P	28.0	6:30 A	41.3	41.0	33.3	11.6
25	29.88	29.75	29.845	57.5	4 P	31.0	5 A	44.3	43 8	38.3	9.6
26	30.07	29.75	29.933	43.0	0 A	19.0	12 P	31.0	31 1	24.5	7 7
27	30.07	29.95	30.039	36.0	4 P	16.5	5 A	26.3	25.4	24.0	11.8
28	30 00	29.79	29.897	47 5	6 P	21.5	5 A	34.5	33.7	31.0	9.7
29	29.86	29.71	29.779	36.5	3 P	23 5	12 P	30.0	29.6	25.3	6.3
30	29.87	29.94	29 809	32.5	3 P	18.0	6 A	25.3	25.6	21.5	8.8
31	29.85	29.71	29.798	50.5	4 P	23.0	4 A	36.7	35 6	28.7	12.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	9 0	.133	50 5	W.N.W.	222	6.0	35	1 P				
2	25.5	.181	77.5	W.	254	8.0	40	10 P	10 A	7 P	T	T
3	11.0	.101	73.0	W.N.W.	555	8.0	40	1 A				
4	14 5	.147	60.0	N.N.W.	285	7.0	37	10 A				
5	21.5	.166	70.5	N.W.	108	1.0	14	12 M				
6	26.0	.188	78.5	N.	79	1.0	14	2 P				
7	20.5	.197	58.0	N.N.W.	112	1.0	14	2 P				
8	16.5	.169	62.0	N.N.W.	263	5.5	33	12 P				
9	14.0	.161	54.5	N.N.W.	295	5.0	32	6 P				
10	18.0	.181	56.0	N.W.	257	6.5	36	3 P				
11	25.5	.187	73.5	N.W.	280	6.0	35	12 M				
12	10.5	.145	51.5	N.W.	271	5.0	32	9 A				
13	18.0	.181	56.0	N.W.	160	3.0	24	3 P				
14	16.0	.179	52.5	N.N.W.	199	7.5	39	12 M				
15	15.5	.173	55 0	N.W.	229	7.5	39	1 P				
16	14.0	.170	49.0	N.W-	144	4.0	28	3 P				
17	22.5	.155	78.0	N.N.W.	209	3.0	24	9 A				
18	17.0	.143	68 0	N.W.	251	3.5	26	10 A				
19	21.5	.175	68.5	W.N.W.	110	3.0	24	1 P				
20	17.0	.183	54.0	W.	157	3.0	24	10 A				
21	26.5	.211	69.0	W.	201	4.5	30	11 A	4 P		T	
22	32.5	.210	86.5	W.N.W.	65	0 0	—	—	5 P	12 P	.05	0.25
23	28.5	.216	74 5	W.	63	2.0	20	4 P	0 A	9 A	.03	T
24	24.0	.233	56 0	W.	115	2 0	20	3 P				
25	31.0	.277	64.0	W. S.W.	163	5.0	32	7 P	8 P		T	
26	16.5	.157	61.5	W.	489	16.0	57	12 M	10 A		T	T
27	20.5	.145	81.0	N.W.	489	9.5	44	1 P				
28	28 0	.187	83.0	W.N.W.	131	3.0	24	12 P				
29	20.0	.150	73 0	N.N.W.	212	6.5	36	12 M	8 A		T	T
30	16.5	.129	74 5	W.N.W.	271	8.5	41	2 P	1 A	6 A	.04	¼
31	20 5	.190	59.0	N.W.	225	3.0	24	6 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during March was abnormal in many respects, but the most noticeable feature of all was the small precipitation record. During the first three weeks of the month only a trace was recorded. The last third of the month had two light snowfalls totaling about one-half inch of snow and melting to about one-eighth of an inch of water—a negligible amount. On examining the precipitation records for this locality, dating from 1836, it is found that it is the smallest monthly record. The next smallest was the record of .27 inches, made in August, 1876.

As might be expected from the general absence of precipitation the amount of sunshine was exceptionally large, the number of hours being greater than for any preceding March since this station was established. More than one-half the days were clear and only a single cloudy day was observed.

Another unusual feature was the persistency of the wind from the northwest quadrant. On but a single date was the prevailing direction outside that quadrant.

Although the sunshine was large, as noted above, the mean temperature for the month was more than two degrees below the normal. The maximum temperature was about five degrees lower than usual and the minimum more than six degrees higher than its normal, giving a comparatively small range for the month.

The mean relative humidity was about nine per cent lower than the normal and the mean dew point about six degrees below the March average.

The mean barometer was exceptionally low and the range the smallest for March since this station was established. The comparatively steady pressure is of especial interest when we take into account the fact that the total wind movement was more than twenty per cent above the normal.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 316. APRIL, 1915

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.21, 22d, 8 A.
Minimum reduced to freezing,	29.24, 29th, 5 P.
Reduced† maximum reading,	30.51, 22d, 8 A
Reduced† minimum reading,	29.52, 29th, 5 P.
Mean semi-daily reduced,	30.034
Monthly range,	0.99

*Air Temperature. In Degrees Fahr.

Highest,	88.0, 25th, 3P.; 27th, 4:30 P.
Lowest,	21.5, 5th, 6A.
Mean hourly,	49.9
Mean of means of max. and min.,	51.1
Mean sensible (wet bulb),	43 4
Monthly range,	66.5
Highest mean daily,	70.9, 27th
Lowest mean daily,	30.1, 3d
Mean maximum,	63.0
Mean minimum,	39.2
Mean daily range,	23.8
Greatest daily range,	42.5, 25th
Least daily range,	8.0, 3d

Humidity.

Mean dew point,	37.5
Mean force of vapor,	.362
Mean relative humidity,	67.8

Precipitation. In inches.

Total precipitation,	3.99
Number of days on which .01 inch or more rain fell	7
Total snow in inches	9.5

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	5195m.
Greatest daily movement,	461m., 4th
Least daily movement,	53m., 6th
Mean daily movement,	173m.
Mean hourly velocity,	7.2 m.
Maximum pressure per square foot, 12.5 lbs.= 50m. per hour, 3d, 10P., N.	
Maximum velocity for 5 minutes, 33m. per hour, 12th, 10A., S.S.W.	
Prevailing Direction, Northwest.	

Summary.

Northwest	13 per cent.
North Northwest	17 " "
South Southwest	17 " "
North Northeast	17 " "
Other directions	36 " "

Weather.

Mean cloudiness observed,	46 per cent.
Total cloudiness recorded by the Sun Thermometer,	179 hrs.=44 per cent.
Number of clear days,	4
Number of fair days,	18
Number of cloudy days,	8

Bright Sunshine.

Number of hours recorded, 223 hrs=56%.

Rain, 6th, 10th, 11th, 12th, 22d, 23d, 27th, 28th, 29th, 30th.

Snow, 2d, 3d.

Thunder and Lightning, 10th, 11th, 25th, 27th, 29th, 30th.

Frosts, 3d, 5th, 22d.

Gales, 35 or more miles per hour: 50m., 3d, N.; 40m., 4th, N.; 44m, 12th, S.S.W.; 44m., 18th, N.; 36m., 20th, N.; 36m., 21st, N.N.E.; 40m., 22d, E.N.E.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.03	29 83	29.948	49.0	2 P	35.0	0 A	42.0	40.3	34.3	5.3
2	30.21	30.03	30.131	49.0	5 P	30.0	6 A	39.5	38.5	32.5	5.0
3	30.20	29.57	29.891	35.0	12 M	27.0	6 P	31.0	30.1	28.3	0.0
4	30.11	29.54	29.831	48.5	4:30 P	28.5	0 A	38.5	37.3	32.5	9.0
5	30.25	30.11	30.232	50.0	4 P	21.5	6 A	35.7	37.3	31.7	8.0
6	30.25	29 99	30.081	45.5	4:30 P	36.0	7 A	40.7	38.6	37.5	1.0
7	30.15	30.04	30.069	52.0	4:30 P	37.0	0 A	44.5	43.3	39.0	2.3
8	30.24	30.04	30.133	67.0	4 P	32.5	5 A	49.7	49.5	41.0	11.7
9	30.29	30.13	30.237	70.0	3:30 P	32.5	6 A	51.3	51.0	42.3	9.5
10	30.15	29.89	29.980	66.0	5 P	46.5	6 A	56.3	54.3	51 5	4.7
11	29.95	29.77	29 865	63.0	2 P	51.0	6 A	57.0	54.5	52.5	2.2
12	30.15	29.79	29.957	64.0	1:30 P	42.0	12 P	53.0	54.3	48.0	10.0
13	30.30	30.15	30.266	53.0	4 P	36.0	4:30 A	44.5	43 6	39.0	9.4
14	30.34	30.23	30.317	61.0	4 P	33.5	6 A	47.3	47.0	43.0	12.2
15	30.32	30.11	30.221	63.0	3 P	33.5	4 A	48.3	47.9	42.3	9.5
16	30.11	29.87	29.975	69.0	3 P	37.5	6 A	53.3	52.2	40.7	9.8
17	29.97	29.90	29.969	67.0	3 P	45.5	4 A	56.0	53 2	46.0	9.0
18	29.97	29 72	29.835	69.5	4:30 P	41.0	6 A	55.3	55.2	45.3	12.4
19	29.75	29.53	29.609	74.5	4 P	46.0	5:30 A	60.3	59.7	50.5	8.6
20	29.99	29.57	29.781	72.0	2 P	53.0	0:30 A	62.5	61.0	50.7	10.7
21	30.43	29.99	30.305	63.0	5 P	40.0	6 A	51.5	50.0	39.5	12.3
22	30.51	30.38	30.477	61.0	1 P	30.0	6 A	45.5	46.4	39.5	10.3
23	30 38	30.10	30.199	69.0	5:30 P	44.0	0 A	56.5	53.7	50.0	6.5
24	30.31	30.16	30.280	69.0	3 P	49.0	2 A	59.0	56.7	48.0	8.2
25	30.23	30.02	30.157	88.0	3 P	45.5	3 A	66.7	57.5	47.0	9.7
26	30.22	29.85	29.993	80.5	6 P	43.0	3 A	61.7	61.7	53.0	9.0
27	30.06	29.80	29.921	88.0	4:30 P	49 5	12 P	68.7	70.9	58.0	10.2
28	30 08	29.91	30.004	54 0	4 P	44.5	6 A	49.3	48 5	46.0	0.0
29	29.91	29 52	29 697	75.0	4:30 P	45.5	5 A	60.3	57.0	53.3	6.9
30	29.71	29.60	29.669	56 0	0 A	40.0	10 P	48.0	46.9	44.0	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	27.0	.233	64.0	N.W.	229	5.0	32	3 P				
2	23.5	.223	57.0	N.W.	116	2.0	20	5 P	1 P		T	T
3	23.0	.173	76.0	N.N.E.	282	12.5	50	10 P	1 P	12 P	.50	9.5
4	27.0	.212	69.0	N.N.W.	461	8.0	40	7 A				
5	23.5	.215	61.5	W.N.W.	75	1.5	17	7 P				
6	34 5	.239	85.0	S.W.	53	1.0	14	0 A	6 A	2 P	.29	
7	32.5	.279	68.0	W.	118	2.0	20	3 P				
8	28.5	.357	44.5	N.W.	204	5.0	32	1 P				
9	34.5	.345	59.0	S.S.W.	145	2.5	22	7 P				
10	49.5	.423	84.0	S.S.W.	211	4.5	30	6 P	4 A	12 P	.20	
11	51.0	.414	92.5	S.S.W.	158	5.0	32	11 P	0 A	11 P	1.55	
12	43.5	.395	74.0	S.W.	414	9.5	44	9 A	6 P		T	
13	34.5	.273	75.5	N.W-	210	4.0	28	9 A				
14	38.0	.315	75.0	W.N.W.	223	4.5	30	12 M				
15	35 5	.332	63.0	E.N.E.	140	3.0	24	12 M				
16	31.0	.336	55.0	N.E.	72	2.0	20	6 P				
17	38.0	.405	56 5	N.N.W.	197	4.0	28	4 P				
18	34.0	.429	45.5	N.	323	10.0	45	7 A				
19	43.5	.487	58.5	N.N.W.	62	1.5	17	2 P				
20	45.5	.538	57.0	N.N.E.	241	6.5	36	1 P				
21	27.5	.321	49.0	N.N.E.	225	6.5	36	7 A				
22	31.5	.303	59.0	S.E.	105	8.0	40	2 P	6 P	8 P	T	
23	47.0	.415	80.0	S.S.W.	125	1.5	17	1 A	8 A	11 A	.02	
24	40 5	.437	58.0	S.E.	77	2.0	20	12 P				
25	44.5	.355	83.0	N.N.W.	165	3.5	26	2 P				
26	47.0	.577	65.5	S.S.W.	103	1.0	14	9 A				
27	52.0	.667	62.5	N.N.W.	148	4.5	30	12 M	8 P		T	
28	43.5	.375	85.0	N.E.	87	1.0	14	1 A	8 A		T	
29	51.0	.469	84 0	N.N.E.	122	1.5	17	6 P	2 A	8 P	.02	
30	42.0	.311	87.0	N.N.E.	104	1.0	14	2 P	7 A	8 P	1.41	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during April was marked by a number of unusual features, the most noticeable of which was a heavy snowstorm on the 3d. This was much the deepest snowfall of the year, but owing its lightness it melted down to a comparatively small amount of water. It was the deepest snow recorded at this station since 1891, when eleven inches fell on the 3d of the month. Nearly all of the remaining precipitation occurred during two extremely heavy thunderstorms on the 11th and 30th.

The high temperatures recorded on the 25th and 27th were almost record breaking for this station.

The records of the various weather elements show the following features of interest: The mean barometer was slightly higher than the normal and the range about nine-tenths of the usual amount. The wind was more variable than usual although the total wind movement was considerably less than the normal.

The mean hourly temperature was more than three and one-half degrees above the normal making it the warmest April since this station was established, excepting only the year 1910, which was seven-tenths of a degree warmer.

The maximum temperature was the highest since 1896 and the minimum was practically normal giving a range of ten degrees more than usual. A mean hourly temperature of more than 70 degrees on the 27th was an exceptional record for April.

The mean dew point was rather high and the relative humidity practically normal. Only a few frosts were noted during the month.

The total precipitation was nearly an inch more than the normal, the two heavy thunderstorms giving about three-fourths of the total. The excess of precipitation for the first four months of the year, over the normal, is nearly four inches.

The sunshine record was practically normal, although only four days were recorded as clear.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 317. MAY, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.98, 11th, 10 P.
Minimum reduced to freezing.	29.16, 4th, 3 P.
Reduced† maximum reading,	30.28, 11th, 10 P.
Reduced† minimum reading,	29.45, 4th, 3 P.
Mean semi-daily reduced,	29.905
Monthly range,	0.83

***Air Temperature.** In Degrees Fahr.

Highest,	80.0, 31st, 6P.
Lowest,	34.0, 16th, 5:30 A.
Mean hourly,	54.1
Mean of means of max. and min.,	53.8
Mean sensible (wet bulb),	48 7
Monthly range,	46.0
Highest mean daily,	63.4, 8th
Lowest mean daily,	44.6, 1st
Mean maximum,	65.4
Mean minimum,	42.2
Mean daily range,	23.2
Greatest daily range,	43.5, 31st
Least daily range,	3.0, 17th

Humidity.

Mean dew point,	43.3
Mean force of vapor,	.430
Mean relative humidity,	66.8

Precipitation. In inches.

Total precipitation,	1.20
Number of days on which .01 inch or more rain fell	11

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	4087m.
Greatest daily movement,	343m., 27th
Least daily movement,	15m., 2d
Mean daily movement,	132 m
Mean hourly velocity,	5.5 m.
Maximum pressure per square foot, 8.5 lbs.= 41m. per hour, 9th, 9P., W.N.W.	
Maximum velocity for 5 minutes, 27m. per hour, 26th, 9P., N.	
Prevailing Direction, West Northwest.	

Summary.

North Northwest	13 per cent.
West Southwest	10 " "
West	13 " "
South	13 " "
Northwest	10 " "
West Northwest	13 " "
Other directions	28 " "

Weather.

Mean cloudiness observed,	46 per cent.
Total cloudiness recorded by the Sun Thermometer,	180 hrs.=40 per cent.
Number of clear days,	11
Number of fair days,	14
Number of cloudy days,	6

Bright Sunshine.

Number of hours recorded. . . 273 hrs=60%.

Rain, 1st, 2d, 4th, 5th, 7th, 8th, 13th, 16th, 17th, 21st, 22d, 24th, 26th.

Thunder and Lightning, 21st.

Frosts, 15th, 16th, 20th.

Gales, 35 or more miles per hour: 39m., 7th, S; 41m., 9th, W.N.W.; 38m, 26th, N.; 39m., 27th, N.W.; 40m., 28th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.86	29.70	29.771	50.0	4 P	41.0	4 A	45.5	44 6	43.0	0.8
2	29.92	29.82	29.901	56.5	4 P	41.0	5 A	48.7	48.3	46.0	4 2
3	29.85	29.68	29.781	59.5	3:30 P	42.0	5 A	50.7	49.8	45 5	10.0
4	29.68	29.45	29.538	64.0	3 P	41.5	5:30 A	52.7	52.5	49.3	9.9
5	29.79	29 49	29 657	60.0	3 P	44.0	8 A	52.0	50.2	46.3	6.0
6	30.03	29.79	29.962	68.5	5 P	49.0	4 A	58.7	57.5	50.3	11.0
7	30.10	29.72	29.969	71.0	12 M	40.0	5:30 A	55.5	57.3	50.5	7.1
8	29.69	29 62	29.656	75 0	4 P	57 0	6 A	66.0	63.4	58.3	7.6
9	29.91	29.61	29.735	68.0	1 P	48.0	12 P	58 0	58.8	51.7	12.1
10	30.10	29.91	30.054	64 0	3 P	41.0	5 A	52.5	53.3	45.5	13.2
11	30.28	30.10	30 247	73.0	4:30 P	46.0	5:30 A	59.5	58 8	47.7	12.9
12	30.26	29.90	30.093	72.5	1 P	45.0	5:30 A	58.7	60.2	53.0	9.4
13	29.90	29.66	29 746	68.0	4 P	45 5	12 P	56 7	59.1	54 7	6.7
14	29.87	29.76	29.825	68 0	3 P	39 0	5 A	53.5	52.6	44.0	11.9
15	29.85	29.72	29 803	64.0	4 P	34 5	4 A	49.3	51.1	44 3	12.5
16	29.96	29 85	29.925	57.0	2:30 P	34.0	5:30 A	45.5	47 1	43.0	9.0
17	29.92	29.84	29.874	47.0	5 P	44 0	1 A	45.5	45.1	43.7	0.0
18	29.96	29.87	29 926	59.0	2:30 P	40.0	6 A	49.5	49.5	47.0	8.8
19	30 16	29 96	30.050	63.0	4 P	39.5	5 A	51.3	50.8	46.5	10.1
20	30.22	30 11	30.179	70.0	3:30 P	35.5	5 A	52.7	55.0	48 5	11.4
21	30.27	29.94	30.189	57.5	10 A	48.0	5 A	52 7	51.6	47.7	0.3
22	29 99	29 75	29 845	77.5	2 P	49.0	0 A	63 3	62.0	59.5	1.0
23	30.05	29.82	29.972	64 0	1 P	47.0	12 P	55.5	54 0	49 7	10.1
24	30.03	29 87	29.953	64 5	10:30 A	42.5	5 A	53.5	54.0	52.0	7.9
25	30.04	29.91	29 982	78 0	4 P	43.5	2:30 A	60.7	61.2	56.0	12.1
26	29.97	29.66	29 845	60.0	8:30 A	41.5	12 P	50 7	53.4	50 3	1.1
27	30.09	29.87	30 000	61.5	3:30 P	35.5	4 A	48.5	49.5	41.0	13 2
28	29 88	29.70	29.790	71.0	4 P	41.0	3:30 A	56.0	57.0	46 0	12.6
29	29.89	29.73	29.822	68.0	5 P	40 5	5 A	54 3	55.3	48.5	13.6
30	29.99	29.89	29.925	68 0	4 P	36.5	5 A	62.3	52 7	48.0	13.1
31	30.10	29.99	30.049	80.0	6 P	36 5	5:30 A	58 3	60.6	52.0	13.7

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	41.0	.297	87.0	N.N.E.	161	2.5	22	12 M	12 M	12 P	.01	
2	44.5	.331	89.5	N.N.E.	15	0.0	—	—	0 A	12 P	T	
3	42.0	.347	76.5	N.N.W.	172	3.0	24	7 A				
4	44.5	.417	71.5	S.W.	65	1.5	17	3 P	8 P		T	
5	43.5	.351	82.0	S.E.	67	0.5	10	6 P	4 A	12 M	.06	
6	44 0	.459	63.0	W.N.W.	97	2.0	20	4 P				
7	46.5	.463	69 5	S.S.W.	126	7.5	39	5 P	2 P	12 P	.03	
8	56.0	.557	81.5	S.W.	212	3.0	24	3 P	0 A	6 P	.31	
9	64.0	.490	65 5	W.	218	8.5	41	9 P				
10	30.5	.413	48.0	W.	197	4.0	28	4 P				
11	36.5	.480	45 5	W.	124	1.0	14	3 P				
12	48.0	.511	67.5	S.S.W.	187	4.0	28	5 P				
13	51.0	.517	72.0	W.S.W.	143	4.0	28	6 P	9:30 A	3 P	.01	
14	32.0	.407	45.5	W.N.W.	70	3.0	24	4 P				
15	33.5	.397	49.5	N.N.W.	143	4.0	28	2 P				
16	35.5	.348	60.5	W.N.W.	88	4.0	28	7 A	4 P	12 P	.02	
17	41.5	.307	85.0	S.	49	1.0	14	1 A	0 A	3 P	.05	
18	43 0	.371	75 5	W.N.W.	98	1.5	17	3 P				
19	41.0	.376	69.5	N.W-	212	5.0	32	12 M				
20	39 5	.462	54.0	N.N.W.	66	2.0	20	1 P				
21	43.5	.390	74.5	E.S.E.	50	1.0	14	3 P	10 A	12 P	.46	
22	58.0	.558	87.5	S.S.W.	182	3.5	26	0 A	0 A	10 P	.04	
23	43.5	.457	63.0	N.W.	212	5.5	33	9 A				
24	49.5	.437	79.0	W.S.W.	39	1.5	17	11 A	4:30 P	5:30 P	.02	
25	51.0	.528	64 5	W.S.W.	73	3.5	26	7 P				
26	46 5	426	74.0	W.	184	7.0	38	9 P	9 A	5 P	.19	
27	33.5	.338	59.0	N.N.W.	343	7.5	39	12 M				
28	34 0	.450	44.5	N.W.	294	8.0	40	2 P				
29	40 5	.455	56 0	E.	99	1.5	17	6 P				
30	40.0	.441	57.0	S.S.W.	57	1.5	17	9 A				
31	43.0	.543	54.5	S.	54	1.0	14	8 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during May was abnormally cool although the amount of sunshine was considerably more than the normal. On more than two thirds of the days the maximum temperature was below 70 degrees and the maximum temperature was 8 degrees lower than the April maximum and then did not occur until the last day of the month. The precipitation was comparatively small but was fairly well distributed throughout the month.

An analysis of the records of the various weather elements shows the following features of interest: The mean barometer was much below the normal while the range was about the average amount. Notwithstanding the prevailing low barometer the amount of fair weather was well above the average for May. The total wind movement was about nine-tenths of the normal amount.

The mean temperature was three and one-half degrees below the normal making it the coolest May, with one exception, since this station was established. May, 1907, was however more than two degrees cooler, having a mean temperature of 51.8 degrees. The maximum temperature was 7 degrees lower than usual and the minimum more than 3 degrees higher than normal giving a very small range for the month.

The mean dew point was very low for the season and the relative humidity well below the normal. The total precipitation was about one third of the normal amount and occurred as small storms on numerous dates. Only one thunder storm was noted.

The rate of progress of the season was slow during the month and at the close of the month the season was slightly backward.

J. E. OSTRANDER, Meteorologist.

R. E. McLAIN, Observer.

BULLETIN No. 318. JUNE, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.94, 5th, 9 P. 28th, 8 A.
Minimum reduced to freezing,	29.30, 23d, 3 A.
Reduced† maximum reading,	30.23, 5th, 9 P. 28th 8 A.
Reduced† minimum reading,	29.60, 23d, 3 A.
Mean semi-daily reduced,	30.020
Monthly range,	0.64

***Air Temperature.** In Degrees Fahr.

Highest,	89.0, 14th, 3.30 P.
Lowest,	37.0, 4th, 5 A.
Mean hourly,	64.2
Mean of means of max. and min.,	64.5
Mean sensible (wet bulb),	57.7
Monthly range,	52.0
Highest mean daily,	72.0, 14th
Lowest mean daily,	55.5, 2d
Mean maximum,	76.9
Mean minimum,	52.1
Mean daily range,	24.8
Greatest daily range,	40.0, 1st
Least daily range,	7.5, 15th

Humidity.

Mean dew point,	53.4
Mean force of vapor,	.593
Mean relative humidity,	71.4

Precipitation. In inches.

Total precipitation,	3.00
Number of days on which .01 inch or more rain fell	8

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	2439m.
Greatest daily movement,	225m., 12th
Least daily movement,	48m., 1st
Mean daily movement,	114 m.
Mean hourly velocity,	4.8m.
Maximum pressure per square foot, 19.5 lbs.= 62m. per hour, 19th, 2P., S.S.W.	
Maximum velocity for 5 minutes, 24m. per hour, 11th, 5P., S. S.W.	
Prevailing Direction, South Southeast.	

Summary.

North Northeast	13 per cent.
South Southwest	17 " "
East	13 " "
East Northeast	10 " "
Southwest	13 " "
West Northwest	10 " "
Other directions	24 " "

Weather.

Mean cloudiness observed,	41 per cent.
Total cloudiness recorded by the Sun Thermometer,	188 hrs.=42 per cent.
Number of clear days,	8
Number of fair days,	18
Number of cloudy days,	4

Bright Sunshine.

Number of hours recorded, . . 269 hrs.=58%.

Rain, 7st, 8th, 15th, 17th, 19th, 20th, 23d, 26th, 27th, 30th.

Thunder and Lightning, 15st, 17th, 20th, 26th;

Gales, 35 or more miles per hour: 36m., 10th, N.; 40m., 11th, S.S.W.; 62m., 19th, S.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.09	29 96	30.036	84.0	4:30 P	44.0	5 A	64 0	65.5	55.7	12.3
2	30.19	30.00	30.151	64 0	1 P	42.5	12 P	53 3	55 5	46 5	10.6
3	30.20	30.11	30.171	66.5	1:30 P	40.0	1 A	53.3	56 6	49.0	9.4
4	30.18	30.08	30.146	75 0	3 P	37.0	5 A	56 0	57.6	50.0	12.7
5	30.23	30.14	30.196	77.5	1 P	43.0	5 A	60 3	61.0	52.0	12.5
6	30.19	30 00	30.060	74.5	1:30 A	51.0	5 A	62.7	63.3	57.0	6 8
7	30.00	29.86	29.933	79.0	2:30 P	62.0	4 A	70 5	68.5	63.5	8 9
8	29.91	29.81	29.848	81.0	5 P	58 0	12 P	69 5	66.3	61.0	6.8
9	29 90	29.78	29 845	79.0	2 P	54.0	4 A	66.5	65.8	56 5	11 2
10	30 11	29.87	30.046	73.0	2:30 P	52.0	4:30 A	62.5	62 0	51.5	11.1
11	30.09	29.83	29 942	75 0	1 P	51.0	4 A	63 0	63.3	54.7	10.2
12	30.12	29.81	29.959	78.0	4 P	55 5	12 P	66.7	67.7	62.7	12.3
13	30.22	30 09	30 158	80.0	1:30 P	48.0	5 A	64.0	64.5	58.0	10.1
14	30.10	30.04	30.078	89.0	3:30 P	59.5	4 A	74.3	72 0	66.7	10.8
15	30.16	30.00	30 098	65.0	5:30 A	57.5	12 P	61.3	60.7	58 5	0.0
16	30.17	30 06	30.121	82.0	3:30 P	57.0	5 A	69 5	68.7	66.5	10 2
17	30.13	30.02	30.082	79 0	4:30 P	62 0	12 P	70 5	67.9	63.3	4.5
18	30.19	30.06	30 124	86 5	2:30 P	55.0	4:30 A	70.7	71.8	65.5	12.6
19	30.09	29 93	30.004	81 0	2 P	62.0	6 P	71.5	68.5	64 5	7.3
20	29.99	29 93	29 971	73.0	6 P	58.0	12 P	65 5	64.8	61.0	6 1
21	30.03	29.89	29.981	76.0	3 P	51.5	5:30 A	63.7	63.0	57.0	12 5
22	29 92	29.64	29 784	74 0	1:30 P	49 5	5:30 A	61.7	60.3	51.7	6.5
23	29.78	29.60	29.716	75 0	3 P	53 0	11:30 P	64.0	61.1	54.7	7.7
24	29.94	29 78	29 885	72.0	3 P	52.0	4 A	62.0	62.1	55 3	12 4
25	30.00	29 92	29 990	77.0	3 P	50 0	5:30 A	63.5	62.2	55.0	7 4
26	30.08	29 97	30 040	76 0	6 P	52.0	3 A	64 0	62.4	59.0	8 9
27	30.20	30.08	30.146	73.0	10:30 A	47 5	5 A	60 3	59.2	52.5	4 5
28	30.23	30 10	30.169	83 5	3 P	47.0	4:30 A	65.3	66 2	58 0	12.3
29	30.12	29 94	30.034	84 0	4 P	53 0	5 A	68.5	69.7	62.3	10 7
30	29 97	29.82	29.890	75 0	1 P	59.5	3:30 A	67.3	66.4	63 0	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	48.5	.619	57.0	S.	48	0.5	10	10 P				
2	38.5	.415	58.0	E.	149	3.0	24	6 A				
3	43 0	.432	65.0	E.N.E.	140	1.5	17	1 P				
4	43 0	.477	58.5	N.E.	61	1.5	17	2 P				
5	46.0	.515	60.0	E.N E.	58	1.0	14	12 M				
6	52.5	.575	69.0	E.N.E.	170	3.0	24	9 A				
7	61.0	.671	81.0	E.	84	1.0	14	3 A	0 A	12 P	T	
8	58 0	.616	80.0	S.W.	110	1 0	14	3 P	7 A	11 A	.12	
9	49.5	.643	55 0	N.N.W.	79	0.5	10	7 A				
10	45 5	.501	61.0	N.N.E.	191	6.5	36	2 P				
11	47 5	.582	57 0	S.S.W.	164	8 0	40	6 P				
12	57 5	.744	64 0	W.N.W.	225	4.0	28	12 M				
13	53.0	.613	66 5	S.S.W.	116	4.5	30	3 P				
14	66 0	.700	92 5	E.	99	1.5	17	2 P				
15	58.0	.513	92 0	E	66	0.5	10	4 A	8 A	11 P	.73	
16	64.5	.740	83 5	S.	69	0.5	10	4 P				
17	61.5	.633	87 5	S.S.W.	102	1.0	14	3 P	4 A	6 P	.66	
18	62 0	.776	73 0	S.S.W.	113	1.0	14	9 P				
19	63 0	.655	88 5	S.S.W.	189	19 5	62	2 P	4 P	12 P	.12	
20	59 0	.595	85.0	N.W.	141	4.0	28	7 P	2 A	12 M	1.00	
21	57.5	.588	82 0	N.N.E.	204	4.5	30	11 A				
22	46 5	.470	68 5	S.W.	98	2.0	20	6 P				
23	51.5	.494	77.5	N.N.E.	125	5.5	33	2 P	3 P	6 P	.03	
24	49 5	.542	64.0	N.N.E.	179	3 5	26	9 A			.19	
25	50 0	548	66 0	W.N.W.	59	1.0	14	3 P				
26	55.5	.588	76.0	S.E.	66	1.5	17	12 M	5 A	1 P	.30	
27	47 0	.494	67 5	W.N.W.	60	5.5	33	1 P	11 A		T	
28	51.5	.653	60.0	N.W.	62	0 5	10	8 A				
29	57 0	.752	62 0	S.W.	75	1.5	17	7 P				
30	60 5	.647	83.5	S W.	137	2.5	22	4 P	12 M	4 P	.04	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during June was generally pleasant and devoid of any abnormal features of importance. While there were no periods of excessive heat the amount of bright sunshine was unusually large.

No precipitation of consequence occurred until about the middle of the month although the total amount was but little under the normal.

An examinatian in detail of the several weather records shows the following as the principal features: The mean barometer was considerably above the normal while the range of pressure was small even for a month when small ranges are expected. As a result of the steady barometric pressure the wind movement was less than the normal. Nearly one half the days showed a prevailing wind direction from some one of the eastern points of the compass, giving a very unusual record for the prevailing direction for the month.

The mean temperature for the month was nearly two degrees lower than the normal and the maximum and minimum records were both lower than the average values for these records, leaving the range equal to the normal amount. On only two days was the mean hourly temperature above 70 degrees and on but four days was it below 60 degrees.

The mean dew point and relative humidity were both lower than the normal value for these elements.

The total precipitation, while slightly less than the normal, consisted mainly of three storms totaling more than 80 per cent of the whole amount.

J. E. OSTRANDER, Meteorologist.

D. POTTER, Observer.

BULLETIN No. 319. JULY, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29 93,24th, 8 A. 28th, 8 A.
Minimum reduced to freezing,	29.19, 8th, 7 P.
Reduced† maximum reading,	30.22, 24th, 8 A.
Reduced† minimum reading,	29.48 8th, 7P.
Mean semi-daily reduced,	29.923
Monthly range,	0.74

***Air Temperature.** In Degrees Fahr.

Highest,	91.0, 31st, 3 P.
Lowest,	48.0, 7th, 4:30 A.
Mean hourly,	68.9
Mean of means of max. and min.,	69.9
Mean sensible (wet bulb),	64.5
Monthly range,	43.0
Highest mean daily,	76.9, 31st
Lowest mean daily,	61.2, 2d
Mean maximum,	80.4
Mean minimum,	59.6
Mean daily range,	20.8
Greatest daily range,	31.5, 13th
Least daily range,	7.0, 1st

Humidity.

Mean dew point,	62.1
Mean force of vapor,	.697
Mean relative humidity,	82.1

Precipitation. In inches.

Total precipitation,	9.13
Number of days on which .01 inch or more rain fell	20

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	2908m.
Greatest daily movement,	251m., 9th
Least daily movement,	21m., 15th
Mean daily movement,	94 m.
Mean hourly velocity,	3. 9m.
Maximum pressure per square foot,	16.0 lbs.= 57m. per hour, 5th, 9A., S.S.E.
Maximum velocity for 5 minutes,	48m. per hour, 5th, 10A., S. S.E.
Prevailing Direction,	Southwest.

Summary.

South Southwest	29 per cent.
South	10 " "
West Southwest	10 " "
Northwest	10 " "
Other directions	41 " "

Weather.

Mean cloudiness observed,	49 per cent.
Total cloudiness recorded by the Sun Thermometer,	271 hrs.=59 per cent.
Number of clear days,	0
Number of fair days,	17
Number of cloudy days,	14

Bright Sunshine.

Number of hours recorded, . . 191 hrs.=41%.

Rain, 1st, 2d, 3d, 4th, 5th, 7th, 8th, 9th, 11th, 12th, 14th, 16th, 18th, 19th, 21st, 22d, 26th, 27th, 30th, 31st.

Thunder and Lightning, 8th, 26th, 30th, 31st.

Gales, 35 or more miles per hour : 57m., 5th, S.S.E.; 41m., 8th, N N.W.; 38m., 9th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.79	29.61	29.683	69.0	10:30 A	62.0	12 P	65.5	65.2	64.0	0.0
2	29.82	29.71	29.813	65.5	3 P	57.5	12 P	61.5	61.2	59.7	0.0
3	29.88	29.78	29.848	83.0	5:30 P	56.5	4:30 A	69.7	68.2	63.0	9.4
4	30.00	29.88	29.984	81.0	2:30 P	63.5	5:30 A	72.3	72.5	68.3	8.7
5	29.90	29.65	29.759	78.0	3 P	61.0	12 P	69.5	69.0	65.5	2.2
6	30.08	29.82	30.004	71.0	5 P	52.5	12 P	61.7	63.2	56.0	8.8
7	30.15	30.00	30.098	76.5	3 P	48.0	4:30 A	62.3	64.2	59.5	6.8
8	30.02	29.48	29.720	68.0	4 P	60.5	12 P	64.3	63.3	61.3	0.0
9	29.89	29.59	29.817	78.0	3 P	55.5	12 P	66.7	65.3	58.7	9.3
10	29.96	29.87	29.926	80.5	4:30 P	52.5	4 A	66.5	68.1	63.7	9.2
11	29.96	29.83	29.916	82.5	2 P	58.0	5 A	70.3	70.5	63.7	7.2
12	29.89	29.75	29.812	76.0	6 P	58.0	3:30 A	67.0	64.0	61.5	4.1
13	29.84	29.74	29.824	88.0	4:30 P	56.5	5 A	72.3	71.9	66.3	10.6
14	29.86	29.78	29.850	84.5	4 P	61.0	4:30 A	72.7	70.0	66.0	8.1
15	29.90	29.81	29.870	87.5	3:30 P	62.0	2:30 A	74.7	72.3	66.7	6.1
16	29.85	29.65	29.778	85.0	2:30 P	61.5	4 A	73.3	72.9	68.3	6.1
17	29.70	29.54	29.617	85.0	4 P	69.0	12 P	77.0	75.3	73.0	2.2
18	29.89	29.70	29.864	84.0	2:30 P	63.0	5 A	73.5	73.1	67.0	11.8
19	29.92	29.75	29.884	85.0	1 P	65.0	5 A	75.0	73.3	67.0	2.2
20	29.95	29.82	29.948	78.0	3 P	61.0	5 A	69.5	69.0	62.5	6.9
21	30.02	29.90	29.958	72.5	11:30 A	60.5	4 A	66.5	64.9	60.0	0.8
22	30.14	30.02	30.120	75.0	2 P	60.0	3 A	67.5	65.8	60.5	4.2
23	30.18	30.09	30.166	80.5	3 P	53.5	3 A	67.0	66.8	62.5	9.6
24	30.22	30.13	30.211	81.0	1 P	54.0	4 A	67.5	66.0	61.0	7.3
25	30.21	30.08	30.182	82.5	3:30 P	54.0	5:30 A	68.3	68.5	64.5	8.9
26	30.19	30.06	30.144	81.0	1 P	60.0	5 A	70.5	67.7	62.7	4.2
27	30.08	30.03	30.078	82.5	4 P	64.0	6:30 A	73.3	70.8	67.0	6.7
28	30.10	29.93	30 052	83.5	3 P	58.0	5 A	70.7	70 3	66.3	5.6
29	29.93	29.80	29.888	87.0	3:30 P	66.0	4 A	76.5	73 9	69.3	7.4
30	29.92	29.83	29.896	89 5	4:30 P	60.5	5 A	75.0	74.6	69.5	11.0
31	29.94	29.87	29.926	91.0	3 P	71.0	5:30 A	81.0	76.9	74.5	5.1

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	63.0	.631	91.0	E.	137	2.0	20	2 P	2 A	3 P	1.55	
2	58.5	.582	94.0	N.N.E.	63	0.5	10	8 P	1 A	12 P	1.22	
3	60.5	.675	80.0	W.S.W.	71	1.5	17	10 P	10 P	12 P	.05	
4	66.0	.786	82.0	S.S.W.	77	1.5	17	7 P	0 A	2 A	.03	
5	63.5	.729	80.0	W.	174	16.0	57	9A	9 A	12 M	.13	
6	50.5	.579	63.0	W.N.W.	206	3.5	26	2 P				
7	55.0	.629	71.0	S.S.W.	77	1.5	17	1 P	7 P		T	
8	60.5	.570	92.0	E.S.E.	149	8.5	41	6 P	6 A	10 P	3.10	
9	55.0	.608	72.0	N.W.	251	7.0	38	6 P	6 P	8 P	.01	
10	59.5	.763	66.0	S.S.W.	117	2.0	20	12 M				
11	59.0	.794	63.0	S.W.	101	1.0	14	5 P	10 P	12 P	.10	
12	60.5	.580	91.0	W.S.W.	67	0.5	10	2 A	0 A	11 A	.43	
13	63.0	.771	75.0	S.W.	65	1.0	14	1 P				
14	64.0	.715	84.5	S.	43	2.5	22	5 P	1 P	6 P	.21	
15	65.0	.729	87.0	S.	21	0.5	10	4 P				
16	65.5	.827	80.5	S.	97	3.5	26	3 P	4 P	6 P	.01	
17	71.5	.864	88.5	W.N.W.	134	2.0	20	5 P				
18	63.5	.804	75.5	N.W.	83	2.0	20	3 P	9 P	11 P	.04	
19	65.0	.739	84.5	S.S.W.	82	5.0	32	3 P	3 P	10 P	.71	
20	59.0	.686	73.5	N.E.	87	1.5	17	9 A				
21	57.5	.593	80.0	N.N.E.	78	0.5	10	11 A	4 P	12 P	.13	
22	58.5	.544	83.0	S.S.W.	78	1.5	17	5 P	10 A	4 P	.01	
23	60.5	.622	87.5	S.S.E.	63	0.5	10	5 P				
24	59.0	.585	54.5	S.S.W.	78	0.5	10	3 P				
25	63.5	.659	90.0	S.S.W.	94	1.0	14	1 P				
26	62.0	.627	88.5	S.S.W.	77	1.5	17	1 P	2 P	12 P	.20	
27	65.5	.718	88.0	N.	68	0.5	10	10 A	0 A	2 A	.03	
28	64.5	.685	88 5	S.S.W.	68	1.5	17	10 P	6 P	11 P	.50	
29	68.0	.778	88.0	W.S.W.	111	0.5	10	11 A				
30	67.5	.838	81.5	W.	49	0.0	—	—	11 P	12 P	.10	
31	73.5	.914	91.0	N.W.	42	2.5	22	2 P	0 A	4 P	.57	

**Rain or meltedsnow at base of tower. *Included in following day.

REMARKS

The weather, during July, was abnormal in many respects, but by far the most noticeable feature was the excessive precipitation. Starting with nearly three inches of rain on the first two days of the month, and within a week, another day with more than three inches in a single storm, the precipitation continued to occur throughout the month on more than half the days, giving a total of more than twice the July normal. Excepting the year 1897, when 14.51 inches was recorded in July, the precipitation this month was the largest for twenty-five years. As might be inferred from the excessive moisture of the month, the relative humidity was nearly ten per cent more than the normal.

A comparison of the records of the several weather elements with the normals for a period of twenty-five years shows the following as the most important features: The mean barometer was comparatively low and the changes in pressure generally slow and small. The range of pressure was practically normal. The total wind movement was about 20 per cent less than normal and more than usual was from the southwest quadrant. The mean hourly temperature was nearly two degrees lower than the normal and the maximum temperature did not reach 90 degrees until the last day of the month. Notwithstanding the absence of especially high temperatures the last week of the month was especially oppressive and sultry. The minimum temperature was nearly three degrees higher than usual giving a comparatively small range for the month.

The mean dewpoint was comparatively high as would be inferred from the high relative humidity referred to above.

Nearly one half the days were cloudy and not a single clear day was noted.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 320. AUGUST, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29 98, 3d, 10 P.
Minimum reduced to freezing,	29.40,25th, 8 A.
Reduced† maximum reading,	30.28, 3d, 10 P.
Reduced† minimum reading,	29.69, 25th, 8 A.
Mean semi-daily reduced,	29.978
Monthly range,	0.59

***Air Temperature.** In Degrees Fahr.

Highest,	88.0, 1st, 1 P., 13th, 4 P.
Lowest,	42.0, 27th, 6 A.
Mean hourly,	66.0
Mean of means of max. and min.,	67.0
Mean sensible (wet bulb),	62 3
Monthly range,	46.0
Highest mean daily,	76.7, 1st
Lowest mean daily,	55.6, 27th
Mean maximum,	76.6
Mean minimum,	57.3
Mean daily range,	19.3
Greatest daily range,	29.5, 11th
Least daily range,	7.0, 4th, 29th

Humidity.

Mean dew point,	60.4
Mean force of vapor,	.635
Mean relative humidity,	85.0

Precipitation. In inches.

Total precipitation,	8.28
Number of days on which .01 inch or more rain fell	14

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement,	3199m.
Greatest daily movement,	250m., 26th
Least daily movement,	41m., 20th
Mean daily movement,	100m.
Mean hourly velocity,	4.2 m.
Maximum pressure per square foot,	9.5 lbs.= 44m. per hour, 8th, 2P., S.S.E.
Maximum velocity for 5 minutes,	42m. per hour, 4th, 2P., E.

Prevailing Direction, West Southwest.

Summary.

Northwest	13 per cent.
South	13 " "
West	10 " "
Northeast	10 " "
Other directions	54 " "

Weather.

Mean cloudiness observed,	63per cent.
Total cloudiness recorded by the Sun Thermometer,	277 hrs.=65 per cent.
Number of clear days,	0
Number of fair days,	16
Number of cloudy days,	15

Bright Sunshine.

Number of hours recorded, 152 hrs.=35%.

Rain, 1st, 2d, 3d, 4th, 5th, 6th, 8th, 9th, 10th, 13th, 15th, 16th, 21st, 22d, 25th, 29th, 30th,

Thunder and Lightning, 1st, 9th, 15th, 22d.

Hail, 9th.

Gales, 35 or more miles per hour: 39m., 4th, E.; 44m., 8th, S.S.E.; 36m , 19th, N.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean, Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.00	29.89	29.976	88.0	1 P	69.0	6 A	78.5	76.7	72.7	4.6
2	29.99	29.85	29.964	81.5	2:30 P	70 0	7 A	75.7	72.7	69.5	1.2
3	30.28	29 99	30.245	67.5	12 M	54.5	12 P	61.0	61.3	55.7	0.6
4	30.25	29.83	30.000	61.5	3 P	54.5	0 A	58.0	57 9	56.7	0.0
5	30.04	29.94	30.023	64.0	5 P	55.0	3 A	59.5	59.9	57.3	0.0
6	30.04	29.97	30 005	65.5	12 M	57.0	2 A	61.3	60.3	59.0	0.0
7	30.06	29.86	29.984	78.0	5 P	56.0	3 A	67.0	66.0	64.0	6.4
8	30.01	29 87	29.958	84.0	3:30 P	62.5	5:30 A	73.3	71.4	67.3	6.5
9	29.93	29.79	29 911	80.0	1 P	62.5	12 P	71.3	67 6	65.5	4.4
10	29.93	29.82	29.916	81.0	3 P	57.5	5:30 A	69.3	67.0	62.7	10 2
11	30.03	29.93	30 010	85.5	4 P	56.0	5:30 A	70.7	70.0	65.7	11.2
12	30.07	29.94	30.038	81.0	1 P	66.0	6 A	73.5	69.0	64.3	3.4
13	29.94	29.80	29.890	88.0	4 P	66.0	6 A	77.0	75.6	72.5	6.0
14	30.01	29.86	29.978	85.0	2 P	64.0	6 A	74.5	73 8	71.0	7.0
15	30.05	29.93	30.006	84.0	3 P	61.0	5:30 A	72.5	72.3	69.0	4.1
16	30.02	29.90	29.979	85.5	3 P	66.0	3 A	75.7	73 0	68.5	6 7
17	30.01	29.82	29.914	74.0	9 A	51.0	12 P	62 5	64.7	59 0	7.4
18	30 01	29.88	29 972	70.0	3 P	47.0	5 A	58.5	59.0	53.0	9.4
19	29.96	29.87	29.954	77.5	2 P	49.0	4 A	63.3	63.5	58.5	7.8
20	30.03	29 94	30.011	82 0	1 P	51.0	5 A	66.5	65.8	59.5	7.7
21	30.04	29.93	30.008	76.0	2 P	55.5	6 A	65.7	65.8	62 5	0.6
22	29 93	29 74	29.815	75.0	11 A	66.0	5 A	70.5	69.7	67.7	0.0
23	29.85	29.73	29 828	81.0	4 P	65.0	12 P	73 0	71.7	67.3	2.9
24	29.91	29.75	29 850	86.0	3 P	58.0	5:30 A	72 0	70.6	67.5	8.4
25	29.84	29.69	29.758	78.0	3 P	58.0	12 P	68.0	69.2	65 5	4.9
26	30.12	29.84	29 976	73.0	3 P	52.0	6 A	62.5	61.1	56.7	7.7
27	30.27	30.12	30.239	70.5	4 P	42.0	6 A	56.3	55.6	51.7	8.9
28	30.20	30.07	30.150	69.0	2 P	44.0	6 A	56.5	56.9	54.3	5.5
29	30.07	29.90	29.966	60.0	5 P	53.0	5 A	56.5	56.5	54 5	0.0
30	29.91	29.83	29.874	72.0	4 P	56.5	0 A	64.3	61.5	60.3	1.9
31	30.22	29.91	30.108	71.0	3 P	52.0	12 P	61 5	59.9	53.5	6.7

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	71.5	.879	89.0	S.W.	52	1.5	17	7 P	9 P	12 P	1.53	
2	69.0	.760	92.0	W.	89	1.5	17	10 P	0 A	7 A	.29	
3	53.0	.508	81.5	N.E.	140	1.5	17	7 A	10 A	6 P	.35	
4	55.0	.508	85 0	N.E.	159	7.5	39	2 P	11 A	11 P	2.61	
5	55.5	.516	85.0	N.N.E.	208	1.5	17	7 A	10 P		T	
6	58.0	.515	94.0	N.E.	119	0.5	10	12 M	8 A	10 P	.44	
7	62.5	.644	88.5	S.	108	1.5	17	2 P				
8	64.0	.783	77.0	S.S.E.	108	9.5	44	2 P	8 P	12 P	.01	
9	64.0	.673	90.0	S.E.	101	2.0	20	2 P	0 A	10 P	.46	
10	60.5	.643	82.5	N.W.	83	2.5	22	1 P	12 M		T	
11	63.5	.728	81 0	S.W.	62	0.5	10	10 A				
12	62.0	.671	84.0	S.E.	100	1.0	14	1 P	4 P	12 P	.46	
13	71.0	.877	88.0	S.	75	0.5	10	5 P	0 A	5 A	.20	
14	69.5	.852	84.5	W.	78	0.5	10	2 P				
15	67 5	.781	87.0	S.S.W.	73	1 0	14	3 P	3 P	8 P	.01	
16	67 5	.753	88.0	W.S.W.	87	0.5	10	2 P	5 P		T	
17	56 0	.578	78.5	N.	192	5.0	32	11 A				
18	48.0	.492	69.5	N.N.W.	167	6.5	36	1 P				
19	55.0	.594	72.0	W.N.W.	65	0.5	10	2 P				
20	60.0	.568	88.0	S.S.W.	41	0.0	—	—				
21	61.5	.604	91 0	S.	48	1.0	14	10 P	6 P		T	
22	66.5	.732	89.5	S.S.E.	250	3.5	26	10 A	1 A	9 P	1.13	
23	66.0	.707	91.5	W.S.W.	106	0.5	10	2 P				
24	66.5	.718	91 5	S.	44	0.5	10	11 P				
25	64.5	.666	91.0	N.W.	144	3.0	24	5 P	1 A	7 P	.29	
26	53.0	.535	77.0	N.W.	144	3.0	24	3 P				
27	47.5	.446	78.0	W.N.W.	55	0.0	—	—				
28	52.5	.464	84.0	E.	57	0.5	10	9 P				
29	53.5	.450	89.5	N.	77	0.0	—	—	4 A	12 P	.14	
30	59.0	.540	94.5	W.	56	0.0	—	—	0 A	1 P	.36	
31	50.0	.496	72.0	N.W.	111	1.5	17	9 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The general character of the weather during the month was similar in many respects to the abnormal record of July. An excessive rainfall, high humidity and much cloudiness were the predominating features. While the precipitation was slightly less than that of July, it was larger than any previous record for August since this station was established. The amount of cloudiness was considerably greater than in the preceding month and the relative humidity several points higher. The two months taken together furnish a very exceptional record for heavy rainfall.

Comparing the records of the several weather elements with the corresponding normals for this station the following features are noted : The mean barometer was slightly lower than the normal and the range of pressure comparatively small. Changes in pressure were generally slow and small. The total wind movement was practically normal and few gales were recorded. Daily wind directions were much more variable than usual.

The mean temperature was nearly two degrees lower than usual and the range slightly smaller than usual. The maximum temperature was comparatively low and one of the dates was the first, the day following the maximum of the month before, which was reached the last day of July. Although frost was feared several times the minimum temperature did not fall below 42 degrees, which is at least six degrees above the record at which frost might be noted in especially exposed places at the level of the ground.

The mean dew point was practically normal, while the mean relative humidity was exceptionally high.

The total precipitation was nearly twice the normal amount. More than one-half the total fell during the heavy storms on the first four days of the month.

Nearly an equal number of cloudy and fair days were noted, while not a single day was rated as clear.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN NO. 321. SEPTEMBER, 1915

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Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.09, 1st, 9 A.; 2d, 8 A.
Minimum reduced to freezing,	29.05, 26th, 6 P
Reduced† maximum reading,	30.37, 1st, 9 A; 2d, 8 A.
Reduced† minimum reading,	29.34, 26th, 6 P
Mean semi-daily reduced	30.050
Monthly range	1.03

***Air Temperature.** In Degrees Fahr.

Highest	93.0, 9th, 4 P; 15th, 1:30 P
Lowest	34.5, 30th, 5:30 A
Mean hourly	64.2
Mean of means of max. and min.	66.0
Mean sensible (wet bulb)	59.3
Monthly range	58.5
Highest mean daily	79.4, 15th
Lowest mean daily	48.6, 28th
Mean maximum	78.1
Mean minimum	53.9
Mean daily range	24.2
Greatest daily range	36.0, 30th
Least daily range	13.5, 6th

Humidity.

Mean dew point	56.3
Mean force of vapor	.601
Mean relative humidity	80.8

Precipitation. In inches.

Total precipitation	1.37
Number of days on which .01 inch or more rain fell	7

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	3332 m
Greatest daily movement	373m, 27th
Least daily movement	15 m, 2d
Mean daily movement	111 m
Mean hourly velocity	4.6 m
Maximum pressure per square foot,	= 54 m per hour, 26th, 11 P, W.
Maximum velocity for 5 minutes,	48 m per hour, 26th, 7 P, W.
Prevailing direction,	Southwest.

Summary.

South	40 per cent
Northwest	17 " "
West	10 " "
Other directions	33 " "

Weather.

Mean cloudiness observed	53 per cent
Total cloudiness recorded by the Sun Thermometer	192 hours = 51 per cent
Number of clear days	4
Number of fair days	16
Number of cloudy days	10

Bright Sunshine.

Number hours recorded, 181 hrs, =|49 per cent

Rain, 7th, 13th, 14th, 16th, 17th, 19th, 21st, 24th, 26th.

Thunder and Lightning, 13th, 16th. 17th, 21st.

Frosts, 23d.

Gales, 35 or more miles per hour: 35m, 21st, W.N.W.; 54m, 26th, W.; 39m, 27th, W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.37	30.21	30.362	74 0	3 P	44 5	6 A	59 7	58.2	53.0	8.2
2	30.37	30.18	30.275	80.5	3:30 P	47 0	6 A	63 7	60.9	55.7	3.3
3	30.20	30.08	30 144	87.0	2:30 P	53.0	5 A	70.0	67.4	62.0	5.0
4	30.08	29.95	30.030	88.0	2 P	57.0	6 A	72.5	69 7	64.5	4.9
5	30.10	30.00	30.094	84.0	3 P	62.5	6 A	73.3	71.0	65.7	5.5
6	30.12	30.04	30.159	77.0	3:30 P	63.5	6 A	70.3	68.4	62.7	4 6
7	30.07	29 92	30.061	80.5	4 P	63 0	6 A	71.7	69.0	66.3	3 5
8	30.03	29 86	29.966	85.0	3 P	69 0	5 A	77.0	73.1	70.5	5.4
9	29.93	29.79	29 884	93.0	4 P	69.0	5 A	81 0	76.4	70.7	7.0
10	29.95	29 87	29.908	87.0	3 P	63.5	7 A	75.3	74.2	68.5	9.5
11	29.98	29 87	29.943	87.5	3 P	56.0	7 A	71.7	70.7	66.7	6.8
12	30.10	29.98	30.066	82 0	4 P	55.5	6 A	68.7	67.4	62.0	8.5
13	30.18	30.02	30.119	80.0	3:30 P	62.0	12 P	71.0	67.8	64.3	1.4
14	30.18	30.07	30.108	92.0	3 P	60.0	1 A	76.0	74.8	72.7	7.1
15	30.21	30.11	30.146	93.0	1:30 P	70.0	3 A	81 5	79.4	75.3	7.9
16	30.23	30.11	30.189	91.0	3 P	71.0	6 A	81.0	78.1	71.5	6 7
17	30.11	29.95	30 064	86.0	1 P	66.5	5 A	76.3	73.9	69.0	5.0
18	30.16	30.00	30.079	76.0	4 P	60.5	5:30 A	68.3	67.2	62.3	8.1
19	30.00	29.84	29.896	78.0	4 P	58 0	5 A	68.0	63.8	60.5	0.4
20	29.97	29 83	29.932	80.0	2:30 P	53.0	6 A	66.5	64.9	60.5	6.4
21	29.83	29 52	29.701	68.0	9 A	52.0	12 P	60 0	62.6	57.0	0.0
22	30.26	29 79	30.124	62.0	3:30 P	41.5	12 P	51 7	52.0	44.7	7 4
23	30.34	30.18	30 279	69.0	3 P	35 0	5:30 A	52 0	51.5	45 5	6.0
24	30.23	30 12	30.186	66.5	4:30 P	45 0	4 A	55.7	52.1	49.7	3.0
25	30.34	30.12	30 280	70 0	4:30 P	42.0	6 A	56 0	55.0	50 0	9.8
26	30.12	29.34	29.664	68.0	6:30 P	44.0	1 A	56.0	55.9	53.3	0.0
27	29.87	29 55	29 820	59 5	3 P	42.0	12 P	50.7	49.5	42.3	8.3
28	29.90	29.78	29.874	62.5	2:30 P	36 0	5:30 A	49 3	48.6	42 5	10.6
29	30.12	29.90	29.987	66.0	2:30 P	40.5	5 A	53.3	52.1	44.3	10.7
30	30.22	30 08	30.162	70.5	3 P	34.5	5:30 A	52.5	50.0	44.5	10.4

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	50.0	.456	81.0	N.N.E.	85	0.0	—					
2	53.0	.479	87.0	S.W.	15	0.0	—					
3	61.0	.612	88.5	W.	32	0.0	—					
4	63.0	.679	85 5	W.	38	0.0	—					
5	62.0	.788	71.0	N.W.	43	0.0	—					
6	60.0	.659	79.0	S.	68	0.0	—					
7	61.0	.691	78.0	S.	70	1.5	17	5 P	4 A	8 A	T	
8	69.5	.806	89 5	S.	128	2.0	20	5 P				
9	69.0	.831	87.5	S.W.	72	0.5	10	3 A				
10	66.5	.813	79.5	W.N.W.	111	2.0	20	4 P				
11	65.0	.752	82.0	W.	52	1.0	14	4 P				
12	59.0	.646	79.0	S.	63	0.5	10	10 P				
13	63.0	.649	88.5	S.E.	81	0.0	—	—	7 A	5 P	.08	
14	72.0	.873	90.0	S.	150	2.5	22	1 A	1 A	2 A	.04	
15	74 5	.913	93.5	S.S.E.	131	1 0	14	2 P				
16	70.0	.838	89.0	S.S.E.	88	1.5	17	6 P	4 P	7 P	T	
17	67 5	.894	84 0	S.	117	2.0	20	12 M	3 P	4 P	.04	
18	60.0	.644	80.0	S.	68	0.5	10	8 P				
19	59.0	.560	90.5	S.	48	0.0	—	—	2 A	8 P	.08	
20	59.5	.558	92.5	S.	124	1.0	14	12 P				
21	52.5	.557	74.0	S.	166	6.0	35	10 P	8 A	3 P	.94	
22	38.0	.364	64.5	N.W.	254	4.5	30	8 A				
23	41.0	.352	72.5	S.	152	2.0	20	1 P				
24	48.0	.380	90 5	S.	31	0.5	10	3 P	7 A	12 M	.02	
25	46.5	.408	78.5	S.	50	5.0	32	7 P				
26	49 5	.480	74.0	W.	296	14.5	54	11 P	8 A	5 P	.17	
27	36 0	.324	66.5	N.W.	373	7.5	39	2 A				
28	34.5	.334	62.0	N.W.	86	5.0	32	4 P				
29	37.5	.358	63.0	N.N.E.	257	3.0	24	1 A				
30	41.5	.321	82.5	N.	33	1.0	14	12 M				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during September was considerably warmer than usual, due largely to a number of extremely warm days about the middle of the month. The highest temperature of the year was registered on the 15th, during a period of high humidity, and caused an unusually large number of prostrations from heat. The last part of the month, while seasonable, was rather cool. The precipitation was small, but owing to the extremely heavy rainfall of the preceding two months vegetation did not suffer.

The mean barometer was slightly below the normal and the range considerably more than usual owing to a minimum considerably lower than usual. The large number of days with wind from the South was exceptional for this station. While the total wind movement was nearly normal, several days near the close of the month showed a large daily record.

The mean hourly temperature was more than three degrees higher than the normal, and the mean of means of maximum and minimum records was nearly two degrees higher than the mean hourly records —an exceptionally large difference.

The maximum temperature was about six degrees higher than the September normal for this feature, and two degrees more than the previous maximum for this year. The minimum was slightly higher than usual, giving a large range for the month. Light frosts were noted near the end of the month, but no damage of consequence was done.

The mean dew point and relative humidity were both much higher than their respective normals.

The total precipitation was about one-third of the normal, and much the greater part was registered during a single storm.

The amount of sunshine was slightly less than the normal.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 322. OCTOBER, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

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Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing	30.11, 16th, 6 A.
Minimum reduced to freezing	29.28, 30th, 2 P
Reduced† maximum reading	30.41, 11th, 9 A; 16th, 6 A.
Reduced† minimum reading	29.58, 30th, 2 P
Mean semi-daily reduced	30.082
Monthly range	0.83

***Air Temperature.** In Degrees Fahr.

Highest	76.0, 13th, 14th, 15th, 17th
Lowest	25.5, 25th
Mean hourly	51.7
Mean of means of max. and min.	52.4
Mean sensible (wet bulb)	47.2
Monthly range	50.5
Highest mean daily	64.0, 15th
Lowest mean daily	39.6, 23d
Mean maximum	63.1
Mean minimum	41.8
Mean daily range	21.3
Greatest daily range	39.0, 17th
Least daily range	4.5, 2d

Humidity.

Mean dew point	44.2
Mean force of vapor	.371
Mean relative humidity	81.6

Precipitation. In inches.

Total precipitation	2.89
Number of days on which .01 inch or more rain fell	7

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	3786 m
Greatest daily movement	315m, 30th
Least daily movement	15 m, 1st
Mean daily movement	122 m
Mean hourly velocity	5.1 m
Maximum pressure per square foot, 12.0 lbs = 49 m per hour, 30th, 1 P, N.W.	
Maximum velocity for 5 minutes, 30m per hour, 30th, 4 P, N.W.	
Prevailing direction, West.	

Summary.

South Southwest	26 per cent
West	19 " "
North Northwest	16 " "
Northwest	10 " "
West Northwest	10 " "
Other directions	19 " "

Weather.

Mean cloudiness observed	44 per cent
Total cloudiness recorded by the Sun Thermometer	179 hours = 52 per cent
Number of clear days	6
Number of fair days	12
Number of cloudy days	13

Bright Sunshine.

Number hours recorded, 162 hrs, =|48 per cent,

Rain, 1st, 2d, 5th, 7th, 8th, 15th, 20th, 26th.

Thunder and Lightning, 26th.

Frosts, 9th. 11th, 25th, 28th.

Gales, 35 or more miles per hour: 36m, 22d, W.N.W.; 35m, 23d, N.W.; 49m, 30th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.15	29.94	30.074	60.5	4 P	37 0	7:30 A	48.7	49.4	45.3	3.0
2	29.94	29.78	29 844	49 0	1 A	44 5	12 P	47.3	47.6	46.5	0.0
3	30.08	29.88	30.004	54.0	12 M	38.0	12 P	46 0	47.5	46.7	0.3
4	30.21	30.03	30.151	67.5	4 P	34.5	2 A	51 0	51.0	46.0	9.4
5	30.03	29.73	29.879	66.0	1:30 P	51.0	12 P	58 5	58.0	56.3	0.2
6	30.11	29.92	30.057	61.5	4:30 P	42.5	12 P	52 0	51.0	46.7	1.4
7	30.21	30.05	30 174	61.5	1 P	38.0	3 A	49.7	50.0	47.0	2.8
8	30.05	29.94	29 975	59 0	4 P	46.5	6 A	52.7	51.0	47.5	3.4
9	30.08	29.94	30.030	58.0	2 P	39 0	7 A	48.5	47.1	39.7	6.5
10	30.33	29 94	30.242	59.0	3 P	37.0	6:30 A	48.0	46.0	40.3	9.4
11	30.41	30 25	30 353	61.0	3 P	28.0	7 A	44.5	45 0	39.7	9.4
12	30.34	30.22	30.300	73 0	3 P	43.5	6:30 A	58.3	56.0	49.5	8 7
13	30.39	30.28	30.369	76 0	2 P	49.0	5 A	62.5	59.0	52.5	7.6
14	30.34	30.20	30.302	76.0	1:30 P	54.0	5 A	65 0	63.1	58.3	5.1
15	30.31	30.18	30.299	76 0	3 P	56.0	12 P	66.0	64.0	57.3	1.5
16	30.41	30 24	30.231	65.0	3 P	46.5	12 P	55.7	55.8	50 3	7.2
17	30.24	30.09	30.192	76.0	3 P	37.0	6 A	56.5	52 8	43 0	7.8
18	30.24	30.10	30.185	70 0	3 P	42.0	6:30 A	56.0	55.1	50.3	8.2
19	30.12	29 98	30.059	67.0	4 P	51 0	0 A	59.0	59.4	57.3	0.6
20	30.03	29.95	30 010	64.0	2 P	59.0	7 A	61.5	61 0	59 7	0.0
21	29.98	29 79	29.942	74.0	1:30 P	48.0	11:30 P	61.0	61.2	55.7	5.9
22	29.99	29 81	29.924	59 0	2 P	42.0	5 A	50.5	50.9	49.5	8.0
23	29.92	29.86	29.910	45.0	1 P	34.0	6 A	39 5	39.6	34.7	7 2
24	30.15	29.90	30.019	53 0	2:30 P	33.0	12 P	43 0	40 4	37.3	7.3
25	30.27	30.15	30.250	56.0	3 P	25.5	6 A	40.7	39 9	35 0	8.9
26	30.23	30 07	30.169	63.5	12 M	39.0	0 A	51.3	52.2	51.7	3.6
27	30.18	30.04	30.153	67.0	3 P	41.0	12 P	54.0	54.1	49 3	6.7
28	30.19	29 99	30.091	62.0	3 P	31.5	6:30 A	46.7	45.7	38 0	8.9
29	30 00	29.66	29 798	62.0	3:30 P	43 0	0¦A	52.5	52.7	49.7	1.9
30	29.79	29 58	29.653	54.5	3 P	45.0	10 P	49 7	48.9	42.0	2.3
31	29.74	29.79	29.898	59 0	2 P	41.0	7 A	50.0	48 4	41.7	8.7

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	42.0	.343	78.5	N.W.	15	0.0	—	—	11 P	12 P	.03	
2	45.5	.322	96.0	N.N.E.	145	1.5	17	5 P	0 A	8 P	.49	
3	45.0	.336	91.0	N.N.W.	42	0.0	—	—				
4	43.0	.349	81.5	S.W.	53	1.5	17	7 P				
5	54 5	.486	88.5	S.	203	4.5	30	10 A	7 A	5 P	.25	
6	45.0	.338	90.0	N.	48	0.5	10	1 P				
7	45.5	.341	89 5	S.	52	1.5	17	10 A	6 P	12 P	T	
8	45 5	.353	87.0	W.	40	0.0	—	—	0 A	7 A	.88	
9	33.5	.286	67.5	N.N.W.	49	1.5	17	2 P				
10	37.0	.273	80.5	N.N.W.	71	2.0	20	2 P				
11	36.5	.279	81.0	S.S.W.	82	2.0	20	5 P				
12	47.0	.396	82.0	S.S.W.	171	2.0	20	2 P				
13	49.5	.458	79.0	S.S.W-	153	3.0	24	5 P				
14	56.5	.541	86.0	S S.W.	175	3.0	24	1 P				
15	55.5	.519	86.5	N.	118	1.0	14	2 P	7 A	8 P	.52	
16	46 0	.431	72.5	W.	51	0.0	—	—				
17	36.5	.342	64.5	W.	33	0.5	10	4 P				
18	49.0	.396	88.0	W.N.W.	52	1.0	14	6 P				
19	55.0	.525	83.5	S.S.W.	166	2.5	22	1 P				
20	59.0	.526	95.5	S.S.W.	31	0.0	—	—	5 A	12 P	.57	
21	54.5	.470	91.5	W.	91	3.5	26	6 P				
22	47.0	.385	85.5	W.N.W.	212	6.5	36	10 A				
23	26.5	.236	60.5	N.N.W.	282	6.0	35	1 P				
24	33 0	.241	79 0	N.N.W.	112	2.5	22	1 P				
25	31.5	.229	78.5	W.	40	0.0	—	—				
26	50.0	.423	85 5	S.S.W.	258	4.5	30	12 M	8 P	12 P	.15	
27	47.0	.379	87.0	W.N.W.	202	3.0	24	4 P				
28	33.5	.263	74.5	W.	55	0.5	19	2 P				
29	47.5	.399	82.5	S.S.W.	212	3.0	24	5 A				
30	35.0	.325	63.5	N.W.	315	12.0	49	1 P				
31	37.5	.302	73.0	N.W.	257	3.0	24	11 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during October was generally seasonable and unmarked by abnormal features. Many fair days and mild temperature combined to make it one of the most pleasant periods of the year. The precipitation was somewhat deficient for the month and the temperature slightly above the normal.

The barometer was rather inactive for the time of year, the range being only about three-fourths of the normal value. The mean pressure was a few hundredths above the normal. The total wind movement was about 500 miles less than usual, and only three days showed gales of moderate intensity. The prevailing wind direction was almost due West, and the eastern points of the compass were hardly noted in the record of wind direction.

The mean hourly temperature was between one and two degrees higher than the normal, and the maximum was three degrees lower than usual, while the minimum was slightly higher than the normal, giving a considerably smaller range than the normal value for this feature.

The mean dew point was comparatively high, and the relative humidity more than six points above the normal.

The total precipitation was about 80 per cent of the usual amount, and most of it occurred during a few well-defined storms of moderate intensity. The last part of the month was comparatively free from rain.

The amount of sunshine was a little less than the normal value.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 323. NOVEMBER, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.16, 18th, 7 A.
Minimum reduced to freezing,	28.89, 19th, 8 P
Reduced† maximum reading,	30.48, 18th, 7 A
Reduced† minimum reading,	29.19, 19th, 8 P
Mean semi-daily reduced	29.993
Monthly range	1.29

***Air Temperature.** In Degrees Fahr.

Highest	69 0, 1st
Lowest	20.0, 18th
Mean hourly	39.9
Mean of means of max. and min.	40.8
Mean sensible (wet bulb)	35.5
Monthly range	49.0
Highest mean daily	49.5, 12th
Lowest mean daily	31.9, 18th
Mean maximum	49.8
Mean minimum	31.7
Mean daily range	18.1
Greatest daily range	34.0, 8th
Least daily range	4.0, 5th

Humidity.

Mean dew point	30.7
Mean force of vapor	.241
Mean relative humidity	74.7

Precipitation. In inches.

Total precipitation	2.20
Number of days on which .01 inch or more rain fell	9
Total snow in inches	0.5

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	5402 m
Greatest daily movement	476m, 16th
Least daily movement	6m, 26th
Mean daily movement	180 m
Mean hourly velocity	7.5 m

Maximum pressure per square foot, 22.0 lbs = 66 m per hour, 15th, 8 P, W.N.W.

Maximum velocity for 5 minutes, 48m per hour, 15th, 9 P, W.N.W.

Prevailing direction, West Northwest.

Summary.

North	17 per cent
North Northeast	13 " "
Southwest	13 " "
West	13 " "
West Northwest	13 " "
South	10 " "
Northwest	10 " "
Other directions	11 " "

Weather.

Mean cloudiness observed	44 per cent
Total cloudiness recorded by the Sun Thermometer	175 hours = 60 per cent
Number of clear days	3
Number of fair days	13
Number of cloudy days	14

Bright Sunshine.

Number hours recorded, 118 hrs, = 40 per cent.

Rain, 2d, 4th, 12th, 14th, 15th, 19th, 21st, 27th, 29th.

Thunder and Lightning, 2d.

Snow, 17th, 23d.

Gales, 35 or more miles per hour: 56m, 2d, W. N. W.; 39m, 3d, N.W.; 44m, 9th, N.W.; 37m, 10th, N.W.; 56m, 13th, W.N.W.; 66m, 15th, W.N.W.: 51m, 16th, W.N.W.; 36m, 20th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.83	29.54	29.644	69 0	2 P	45.0	0 A	57.0	56.2	50.5	4.8
2	29.80	29.47	29.639	58.0	9 A	43.0	12 P	50.5	49.4	45.7	3.1
3	30.14	29.80	30.004	60.0	3 P	37.0	12 P	48.5	42.5	37.7	3.9
4	30.16	29.85	30.074	58.0	1 P	27.0	6:30 A	42.5	38.2	33.5	5.3
5	30.08	29.75	29.939	42.0	4 P	38.0	11 A	40.0	40.2	37.7	0 0
6	30.25	30.08	30.188	50.0	3 P	32 0	12 P	41.0	41.5	35.5	7.3
7	30.23	30.10	30.196	54.5	3 P	27.0	7 A	40.7	39.9	34.5	8.5
8	30 22	29.98	30 124	61.0	3 P	27.0	6 A	44.0	43.6	39 3	8.3
9	30.05	29.87	29 998	59 0	12 M	43.5	12 P	51.3	47.7	41.3	6.4
10	30.25	30.05	30.237	52.5	3 P	36 0	12 P	44.3	42.5	39.0	9.2
11	30.29	30.18	30.246	34.5	3 P	31.0	4 A	32.7	41.6	38 0	1.6
12	30 18	29 92	30.006	55 5	2 P	43.5	7 A	49.5	49 5	45 7	0.0
13	30.13	29 94	30.076	54 0	2:30 P	31.0	6 A	42.5	44.2	37.0	7.8
14	30.12	29 70	29.979	46.0	2:30 P	32.0	7 A	39.0	40.7	34.3	1.1
15	29.70	29.26	29.465	44 5	4 P	38 0	3 A	41.3	40.1	35.5	0.0
16	30.04	29 59	29 925	42.0	2 P	29.0	12 P	35.5	35 2	30.0	7.5
17	30.38	30.04	30 267	43 0	3 P	26.5	3 A	34.7	32.2	28.3	4.7
18	30.48	30.19	30.366	48.0	3 P	20 0	7 A	34.0	31.9	24 0	6.9
19	30.19	29 19	29.554	56.5	9 P	26.5	0 A	41.5	42 3	44.3	0.0
20	29.67	29.23	29.445	48 0	2 P	39.0	9 P	43.5	42.3	37.3	1.2
21	29.78	29.49	29 686	50.0	2 P	35.0	7:30 P	42.5	41.2	36.5	0.0
22	30.07	29.78	29.959	42.0	2 P	30 5	7 A	36 3	36.0	31.0	4 4
23	30.19	30 07	30.166	49 0	2 P	27.0	7 A	38.0	34 4	31.7	1.4
24	30.33	30.12	30.262	37.5	2 P	28 5	12 P	33 0	32.4	30.0	1.0
25	30.46	30 31	30 404	48.5	3:30 P	23.5	7 A	36 0	33.0	29 5	6 9
26	30.31	30 07	30.218	50.0	4 P	23.0	7 A	36.5	33.2	29 0	6.3
27	30.07	29.95	30.011	39 0	4 P	24.0	7 A	31.5	32.5	30.7	0.0
28	30 08	29 95	30.011	58.5	2:30 P	32.5	7 A	45 5	40.7	33.7	4 5
29	29.96	29 55	29 718	44.0	10:30 A	30.0	1 A	37.0	38 4	34.0	0.0
30	30.07	29.65	29.937	41.0	2 P	26.5	12 P	33 7	34.7	30.0	6.2

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	47.5	.419	78.0	S.	224	2.0	20	1 A				
2	42.0	.353	75.5	W.N.W.	230	15.5	56	2 P	10 A	1 P	.03	
3	32.5	.265	67.5	N.W.	382	7.5	39	3 P				
4	28 5	.213	73.0	S.W.	112	2.0	20	12 P	6 P	12 P	.07	
5	34 5	.245	82.0	N.	251	3.0	24	7 P				
6	30.0	.238	70.5	N.	267	6.0	34	8 A				
7	27.5	.237	62.0	N.	269	6.0	34	9 A				
8	41.5	.319	82.5	N.N.E.	99	1 0	14	12 P				
9	34.5	.302	68.5	W.N.W.	226	10.0	44	7 P				
10	35 5	.259	81.0	N.W.	328	7.0	37	10 A				
11	36.5	.244	88.0	S.S.W-	17	0.0	—	—				
12	42.0	.357	75 5	S.	87	1.5	17	5 P	7 P	9 P	.02	
13	30 5	.262	64.0	W.N.W.	235	15.5	56	11 A				
14	26.5	.240	61 5	S.	105	1.0	14	7 P	7 P	12 P	.05	
15	28.0	.237	67 5	W.N.W.	182	22.0	66	8 P	0 A	7 P	.96	
16	23.0	.190	69 0	W.	476	13.0	51	3 P				
17	24 0	.167	79 0	W.	154	4 0	28	12 M	11 A			T
18	14 5	.152	57.5	N.W.	83	1.0	14	1 A				
19	41.0	.336	78 5	S.W.	139	6.0	34	8 P	8 A	10 P	.76	
20	32 0	.247	74.0	S.W.	424	6.5	36	9 A				
21	32.5	.242	75 5	W.S.W.	215	5 5	33	2 P	7 A	8 P	.01	
22	22.0	.201	64 0	W.	248	2.5	22	12 M				
23	25 5	.198	69.5	S.W.	150	2.0	20	12 M	9 P			0.5
24	27.5	.170	92.0	N.	105	1.5	17	2 P				
25	26.0	.174	81.5	N.N.E.	34	0.0	—	—				
26	26.5	.169	86.5	N.N.E.	6	0.0	—	—				
27	29.0	.178	95.0	N.N.E.	21	0.5	10	3 P	2 P	4 P	.02	
28	31 0	.208	83.5	N.E.	41	0.5	10	10 A				
29	29.0	.217	75.5	N.	67	1.0	14	4 P	4 A	9 P	.28	
30	21.5	.184	63.5	W.	225	3.0	24	1 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during November was slightly warmer than usual and the precipitation was somewhat deficient. During the first half of the month the wind movement was unusually large and numerous gales were registered on the pressure chart,—three showing a velocity of more than fifty miles per hour. The fluctuations of pressure shown by the barometer chart about the middle of the month were rather unusual, especially the drop of an inch in twenty hours on the 19th.

The records of the several weather elements show the following features of interest: The mean barometer was considerably less than the normal and the maximum and minimum pressures were both low. The range of pressure was practically normal. The total wind movement was about twenty per cent. more than the usual and most of the high wind was from the northwest quadrant.

The mean temperature was about one and one-half degrees higher than the normal and the maximum and minimum for the month were both several degrees above the usual values for these records. The range of temperature was practically normal. During the last half of the month there was comparatively little freezing weather and but very little ice was formed.

The mean dew point and relative humidity were both practically normal.

The total precipitation was just one inch less than the normal amount. Nearly the whole amount fell during the rapid falls of the of the barometer on the 15th and 19th.

The amount of sunshine recorded was a little less than usual.

The month closed with the temperature comparatively mild.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 324. DECEMBER, 1915

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.19, 31st, 12 P
Minimum reduced to freezing,	28.55, 26th, 9 A
Reduced† maximum reading,	30.52, 31st, 12 P
Reduced† minimum reading,	28.85, 26th, 9 A
Mean semi-daily reduced	29.949
Monthly range	1.67

***Air Temperature.** In Degrees Fahr.

Highest	53.0, 26th, 4:30 A
Lowest	2.0, 31st, 7 A
Mean hourly	26.6
Mean of means of max. and min.	27.0
Mean sensible (wet bulb)	23.3
Monthly range	51.0
Highest mean daily	36.5, 18th
Lowest mean daily	16.3, 31st
Mean maximum	34.5
Mean minimum	19.4
Mean daily range	15.1
Greatest daily range	30.0, 26th
Least daily range	6.0, 29th

Humidity.

Mean dew point	17.9
Mean force of vapor	.162
Mean relative humidity	71.6

Precipitation. In inches.

Total precipitation	5.86
Number of days on which .01 inch or more rain fell	12
Total snow in inches	12.3

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	4947 m
Greatest daily movement	490m, 4th
Least daily movement	11m, 31st
Mean daily movement	160 m
Mean hourly velocity	6.7 m

Maximum pressure per square foot, 13.0 lbs = 51 m per hour, 26th, 2 A, S.

Maximum velocity for 5 minutes, 48m per hour, 26th, 2 A, S.

Prevailing direction, West Northwest.

Summary.

Northwest	26 per cent
West Northwest	16 " "
South Southwest	13 " "
North	10 " "
South	10 " "
West Southwest	10 " "
North Northwest	10 " "
Other directions	5 " "

Weather.

Mean cloudiness observed	55 per cent
Total cloudiness recorded by the Sun Thermometer	177 hours = 62 per cent
Number of clear days	9
Number of fair days	6
Number of cloudy days	16

Bright Sunshine.

Number hours recorded, 106 hrs, = 38 per cent.

Rain, 2d, 8th, 9th, 13th, 14th, 17th, 18th, 23d, 25th, 26th, 28th, 29th.

Hail, 17th, 29th.

Snow, 2d, 6th, 8th, 9th, 13th, 14th, 19th, 20th, 26th, 28th, 29th.

Gales, 35 or more miles per hour: 40m, 10th, N.W.; 49m, 13th, N.N.W.; 49m, 14th, N.N.W.; 37m, 15th, W.. 37m, 18th, N.W.; 51m, 26th, S.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.19	30.06	30.161	41.0	3 P	21.5	4 A	31.3	28.0	22.7	7.2
2	30.17	30.08	30.101	33.0	2 P	23.0	7 A	28.0	27.9	25.7	0.0
3	30.09	29.96	30.018	39.0	2 P	24.0	12 P	31.5	30.4	26.0	5.0
4	30.08	29 98	30.046	34.0	1 P	17 5	7 A	25.7	26.3	22.3	6.5
5	30.09	30.03	30.068	38.0	2 P	25.0	6 A	31.5	29.7	24.3	6.0
6	30.11	30.00	30.061	33.5	3 P	27.0	3 A	30.3	30.7	27.7	9.4
7	30.19	30.08	30.146	33.0	2:30 P	20 0	12 P	26.5	28.0	22.3	0.0
8	30.08	29.53	29.723	31.0	11 P	18.0	2 A	24.5	24.6	23.5	0.0
9	29.53	29.37	29.432	35 0	2 P	23.5	12 P	29.3	28.4	22.7	0.1
10	29.91	29 52	29 788	27 0	3 P	17.0	9 A	22.0	22.0	17.0	5.1
11	30.12	29.91	30.099	28.0	3:30 P	15.5	7 A	21.7	20.5	16.7	8.1
12	30.13	30 03	30.081	36 0	3:30 P	9.0	7:30 A	22.5	20.9	14.3	0.0
13	30.03	29 05	29 623	32.0	11 P	17.0	0 A	24.5	25.6	22 7	0.0
14	29 57	29 02	29.361	32.0	7 A	22.0	12 P	27.0	26.9	21.7	0.0
15	29.88	29.57	29.733	25.0	2 P	18.0	8 A	21.5	21.5	14 3	0.0
16	30.18	29.88	30.038	32.0	2 P	12.0	12 P	22.0	21.6	16 7	0.0
17	30.19	29 67	29.946	30.0	12 P	8.0	1 A	19.0	18.0	16.5	0.0
18	29.68	29 22	29.499	40.0	9 P	30 0	0 A	35.0	36.5	37.0	0 0
19	30 01	29.68	29.902	39.0	1 A	29.0	12 P	34 0	34.7	30.7	5.3
20	30.12	29.99	30.095	32.5	3 P	25.5	12 P	29 0	28.3	27.0	8 4
21	30.13	29 95	30.076	34 0	2:30 P	15.5	12 P	24.7	22.6	17.7	8.0
22	30.32	30.13	30 284	31.0	2:30 P	11.0	4 A	21.0	21.2	18 0	7.5
23	30.23	29.80	30 014	35.0	12 P	14.0	5 A	24.5	26.3	24.7	5.0
24	30.18	29 79	30.058	40.0	3 P	28 0	7 A	34.0	34 0	30.7	0.5
25	30.19	29.55	29 914	48.0	12 P	28.0	8:30 A	38.0	33.3	31.5	0.5
26	30.04	28.85	29 405	53.0	4:30 A	23.0	12 P	38.0	35.7	33.0	0.0
27	30.17	29.98	30.096	35.5	3 P	21.0	3 A	28.0	28 8	27.3	7.1
28	30.02	29 85	29.958	34.0	4:30 A	27.0	12 P	30.5	31.7	31 7	0.0
29	30.13	29 72	29.972	27.0	0 A	21.0	11 P	24.0	23.6	22.5	0.0
30	30.39	29.84	30.279	31.0	3 P	9 5	12 P	20 3	20 7	16 5	8.3
31	30.52	30.26	30.435	30.5	6 P	2.0	7 A	16.3	16.3		8.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	11.5	.145	55.5	W.S.W.	50	0.5	10	2 P				
2	19.0	.152	73.0	W.S.W.	16	0.0	—	—	10 A	12 P	.03	0.3
3	20.5	.155	75.0	W.S.W.	62	0.5	10	4 P				
4	17.5	.131	77.5	N.W.	104	3.0	24	6 P				
5	17.0	.149	66.0	N.W.	64	3.0	24	12 M				
6	21.0	.171	68.5	N.	174	4.0	28	12 M	10 A			T
7	10.5	.145	51.0	N.N.W.	288	5.0	32	1 A				
8	16.5	.154	64.5	S.S.W.	175	0.5	10	12 M	5 A	12 P	.12	0.7
9	12.5	.144	56.5	W.N.W.	115	5.0	32	7 P	0 A	6 P	.06	0.3
10	5 5	.110	54.5	N.W.	426	8.0	40	3 P				
11	8.0	.106	67.0	N.W.	305	4.0	28	10 A				
12	7.0	.096	67.5	N.N.W.	54	2 0	20	10 A				
13	15.0	.142	63.5	N.N.W.	143	12.0	49	10 P	6 A	12 P	.51	6.0
14	7 0	.144	44.5	N.W.	490	12.0	49	1 A	0 A	5 A	.17	2.0
15	−21.5	.112	14.0	W.	336	7.0	37	12 M				
16	11 0	.109	54.0	W.N.W.	154	3.0	24	1 P				
17	12.5	.093	78.0	N.W.	20	0.5	10	2 A	9 A	12 P	1.08	
18	36.0	.225	93.5	N.W.	133	7.0	37	6 P	0 A	7 P	1.30	
19	26.0	.189	77.0	W.N.W.	282	2.5	22	10 A	3 P			T
20	24 0	.155	86.0	W.N.W.	208	3.0	24	10 A	8 A			T
21	8 5	.112	60 5	S.	89	3.0	24	10 A				
22	11.5	.114	68.0	S.	66	0.5	10	11 P				
23	23.5	142	96.0	S.	27	0.0	—	—	5 P	12 P	.19	
24	28.5	.180	88.0	S.W.	89	0 5	10	3 P				
25	29.0	.185	89.5	E.N.E.	110	3.0	24	11 P	5 P	12 P	1.20	
26	31.0	.200	91.5	W.N.W.	482	13.0	51	2 A	0 A	10 P	.40	T
27	25.0	.156	86.5	S S.W.	126	1.0	14	9 A				
28	30.0	.183	92.5	S.S.W.	30	0.0	—	—	10 A	8 P	.26	T
29	21.0	.124	93.0	N.W.	122	3.0	24	4 P	10 A	12 P	.54	2.0
30	13.5	.099	84.5	N.	196	1.0	14	11 A				
31	14.0	.106	82.0	N.	11	0.0	–	—				

**Rain or melted snow at base of tower. *Included in following day.

Annual Summary for 1915.

Pressure. In inches.

Maximum reduced to freezing, ... 30.26, Feb. 19th, 8 A.
Minimum reduced to freezing, ... 28.55, Dec. 26th, 9 A.
Maximum reduced to freezing and sea-level, ... 30.58, Feb. 19th, 8 A.
Minimum reduced to freezing and sea-level, ... 28.85, Dec. 26th, 9 A.
Mean reduced to freezing and sea-level, ... 29.992
Annual range, ... 1.73

***Air Temperature.** In degrees Fahr.

Highest, ... 93.0, Sept. 9th, 4P.; 15th, 1:30 P.
Lowest, ... —4.0, Jan. 5th, 8 A.
Mean hourly, ... 47.6
Mean of means of max. and min., ... 48.4
Mean sensible (wet bulb), ... 43.3
Annual range, ... 97.0
Highest mean daily, ... 79.4, Sept. 15
Lowest mean daily, ... 7.8, Jan. 30
Mean maximum, ... 58.6
Mean minimum, ... 38.3
Mean daily range, ... 20.3
Greatest daily range, ... 43.5, May 31
Least daily range, ... 3.0, May 17

Humidity.

Mean dew point, ... 38.8
Mean force of vapor, ...381
Mean relative humidity, ... 75.6

Wind.

Prevailing direction, ... West Northwest

Summary.

Northewst, ... 14 per cent.
South Southwest . . . . . 11 " "
West, ... 10 " "
South . . . . . 10 " "
West Northwest . . . . . 10 " "
North Northwest . . . . . 10 " "
Other directions, ... 33 " "
Total movement, ... 50,486 m
Greatest daily movement, ... 555 m., Mar. 3
Least daily movement, ... 1 m., Jan. 4
Mean daily movement, ... 141 m
Mean hourly velocity, ... 5.9 m

*Temperature in ground shelter.

Maximum pressure per square foot, 22.0 lbs.=66 m. per hour, Nov. 15, 8 P., W.N.W.
Maximum velocity for 5 minutes, 48 m. per hour, July 5th, 10 A., S.S.E.; Sept. 26th, 7P, W.; Nov. 15th, 9 P., W.N.W., Dec. 26th, 2A., S.

Precipitation. In inches.

Total precipitation, rain or melted snow, . 51.58
Number of days on which .01 or more rain or melted snow fell, ... 122
Snow total in inches, ... 40.8

Weather.

Mean cloudiness observed, ... 43 per cent.
Total cloudiness recorded by Sun Thermometer, ... 2230 hrs.=50 per cent.
Number of clear days, ... 82
Number of fair days, ... 156
Number of cloudy days, ... 127

Bright Sunshine.

Number of hours recorded, 2224 hrs.=50 per cent.

Dates of Frosts.

Last, ... May 20th
First, ... Sept. 23d

Dates of Snow.

Last, ... April 3d
First, ... Nov. 17th
Total days of sleighing, ... 50

Gales of 50 or More Miles Per Hour.

Jan. 13th, 50m., N.; Mar. 26th, 57m., W.; April 3d, 50m, N.; June 19th, 62m., S.S.W.; July 5th 57m., S S.E.; Sept. 26th, 54m, W.; Nov. 2d, 56 m, W.N.W.; 13th, 56m, W.N.W.; 15th, 66m W.N.W.; 16th 51m, W.N.W.; Dec. 26th, 51m, S.

DAVID POTTER,
Observer.

J. E. OSTRANDER,
Meteorologist.

BULLETIN No. 325. JANUARY, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.31, 8th, 9 A; 29th, 10 A.	
Minimum reduced to freezing, 29.17, 5th, 12 P	
Reduced† maximum reading, 30.64, 8th, 9 A	
Reduced† minimum reading, 29.47, 5th, 12 P	
Mean semi-daily reduced	30.184
Monthly range	1.17

***Air Temperature.** In Degrees Fahr.

Highest	57.5, 28th, 9:30 A
Lowest	—5.0, 15th, 7:30A
Mean hourly	27.9
Mean of means of max. and min.	27.7
Mean sensible (wet bulb)	25.8
Monthly range	62.5
Highest mean daily	49.1, 27th
Lowest mean daily	8.2 15th
Mean maximum	36.1
Mean minimum	19.5
Mean daily range	16.6
Greatest daily range	32.0, 28th
Least daily range	6.0, 12th

Humidity.

Mean dew point	21.4
Mean force of vapor	.166
Mean relative humidity	81.4

Precipitation. In inches.

Total precipitation	2.56
Number of days on which .01 inch or more rain fell	9
Total snow in inches	5.0

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	6341 m
Greatest daily movement	435m, 14th
Least daily movement	17m, 1st
Mean daily movement	205 m
Mean hourly velocity	8.5 m

Maximum pressure per square foot, 25.0 lbs = 71 m per hour, 23d, 1 A, W.

Maximum velocity for 5 minutes, 36m per hour, 23d, 1 A, W.

Prevailing direction, West.

Summary.

North	19 per cent
South Southwest	13 " "
West	16 " "
South	13 " "
Northwest	16 " "
Other directions	23 " "

Weather.

Mean cloudiness observed	44 per cent
Total cloudiness recorded by the Sun Thermometer	154 hours = 52 per cent
Number of clear days	13
Number of fair days	3
Number of cloudy days	15

Bright Sunshine.

Number hours recorded, 140 hrs, = 48 per cent.

Rain, 1st, 2d, 3d, 5th, 10th, 13th, 20th, 27th, 30th.

Hail, 1st, 2d, 20th.

Snow, 2d. 3d, 10th, 16th, 17th, 20th, 30th.

Days of Sleighing, 23.

Gales, 35 or more miles per hour: 35m, 4th, S.S.W.; 36m, 5th, S.S.W.; 44m, 6th, N.W.; 40m, 14th, N.W.; 41m, 17th, W.N.W.; 59m, 22d, W.; 71m, 23d, W.; 44m, 28th, W.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.29	29.85	30.011	33.0	5 P	20.0	3 A	26.5	26.6	25.7	0.0
2	30.01	29.73	29.851	36.0	3 P	23.0	6 A	29.5	31.2	29.5	0.0
3	30.07	29.74	29.884	35.5	11 A	20.0	12 P	27 7	31.2	27.5	3.5
4	30.39	30.04	30 294	29.0	12 P	11.0	7:30 A	20 0	20.5	18.3	7.0
5	30.04	29.47	29.708	43.0	12 P	29.0	0 A	36.0	35.7	36.0	0.6
6	30.28	29.47	30.007	45.0	2 A	18.0	12 P	31.5	29.5	24.5	8.9
7	30.54	30.28	30.399	27.0	2 A	8.0	12 P	17.5	17.9	13.0	6.8
8	30.64	30.53	30.573	16.0	2 P	0.0	7:30 A	8.0	8.7	5.5	6.7
9	30.62	30.41	30.506	23 0	2:30 P	−2.0	8 A	10.5	9.3	6.0	8.1
10	30.41	29.74	29.948	35.0	8 P	13.0	0 A	24.0	25.8	26.3	0.0
11	30.20	29.74	30.012	40.0	1:30 P	28.0	12 P	34 0	33.8	30.0	4.5
12	30.44	30.20	30.379	25.0	11 P	19.0	9:30 A	22.0	23.8	20 5	0.0
13	30.33	29.88	30.047	37.0	4 P	24.0	12 P	30.5	30.5	29.5	2.3
14	30.40	30.09	30 215	31.0	0 A	4.0	12 P	17.5	17.5	11.0	8.2
15	30.53	30.15	30.408	19.0	2:30 P	−5.0	7:30 A	7.0	8.2	6 3	7.5
16	30.15	29.63	29.763	32.0	3 P	19.0	0 A	25.5	24.5	22.3	3.6
17	29.93	29.59	29.786	24.0	0 A	10 0	8 A	17.0	13.4	9.0	6.6
18	30.13	29.91	30.017	19.0	2 P	6.0	0 A	12.5	11.5	7.7	7.7
19	30.57	30.13	30.397	23.0	3 P	8.0	6:30 A	15.5	15.6	11.3	7.9
20	30.61	30.16	30.431	36.0	12 P	17.0	3 A	26.5	24 9	25.5	0.0
21	30.40	30.17	30 340	43.0	3 P	36.0	0 A	39.5	39.6	38.3	1.0
22	30.21	29.71	29.872	51.0	3 P	37.0	5:30 A	44.0	44 4	45.0	1.9
23	30.41	29 84	30.242	43.0	2 A	28.5	11:30 P	35.7	34.4	30.5	8.2
24	30.61	30 41	30.571	41.0	1 P	22.0	2 A	31.5	34.6	33 3	8.1
25	30.55	30.37	30.447	48.0	3 P	30.0	0 A	39 0	39.8	39.0	4.1
26	30.43	30.36	30.421	53.0	3 P	40 5	6 A	46.7	46.2	44.7	6.3
27	30.40	30.07	30.278	55.0	8:30 P	45.0	10 A	50.0	49.1	49 7	3.3
28	30.40	29.92	30.070	57.5	9:30 A	25.5	12 P	41.5	43.7	40.5	2.5
29	30.63	30.51	30.571	34 0	4 P	16.5	7:30 A	25 3	24.5	21.3	7.2
30	30.53	30.01	30.292	32.5	12 P	20.5	3:30 A	26 5	27.3	26.7	0.0
31	30.09	29.83	29.972	51.0	5 P	32.0	1 A	41.5	42.2	42.5	3.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	24.0	.144	94.0	N.	17	1.0	14	6 P	3 A	12 P	.18	
2	26.5	.173	84.0	E.N.E.	126	0.5	10	5 A	0 A	12 P	.62	2.75
3	23.0	.166	76.0	W.N.W.	319	2.0	20	2 A	0 A	5 A	.11	T
4	15.5	.108	85.0	N.	240	6.0	35	12 P				
5	32.5	.225	87.0	S.S.W.	378	6.5	36	5 P	2 A	10 A	.11	
6	21.0	.145	82.0	N.W.	242	9.5	44	8 A				
7	10.0	.085	82.5	N.W.	80	3.0	24	3 P				
8	−4.0	.067	62.5	N.W.	150	3.0	24	8 A				
9	1.0	.062	82.5	N.	67	1.0	14	0 A				
10	24.0	.155	88 5	N.	59	1.5	17	8 P	10 A	11 P	.48	1.75
11	27.5	.176	85.0	W.	190	3.0	24	4 P				
12	15.5	.133	76.5	N.	150	2.5	22	5 A				
13	29.5	.151	89.5	N.W.	149	3.5	26	8 P	1 A	1 P	.77	
14	4 5	.084	72.5	N.W.	435	8 0	40	4 P				
15	−1.5	.071	66.5	S.S.W.	225	3.0	24	8 P				
16	18.5	.131	78.0	S.	190	5.0	32	10 P	6 A			T
17	0.5	.074	61.5	W.	367	8.5	41	7 A	7 A	4 P		T
18	1.5	.068	71.5	W.S.W.	247	3.5	26	2 P				
19	6 0	.065	70 5	W.	268	5.5	33	2 P				
20	23.0	.150	80.0	S.	175	3.0	24	6 P	10 A	2 P	.09	0.5
21	35.5	247	86.0	S.S.E.	202	1.5	17	0 A				
22	40.5	.315	80.0	S.W.	322	17.5	59	12 P				
23	27.0	.184	80.0	W.	420	25.0	71	1 A				
24	29.0	.211	75.5	W.S.W.	90	2.5	22	7 P				
25	38.0	.249	91.5	S.S.W.	208	2.5	22	10 A				
26	44 0	.304	94.0	S.	148	1.5	17	3 A				
27	48 5	.369	93.5	S.	93	4.5	30	11 P	1 A	5 A	.08	
28	38.0	.280	84.0	W.	317	9.5	44	11 A				
29	16.5	.127	77.0	N.	236	4.0	28	7 A				
30	25.0	.150	94.0	E.S.E.	50	1.5	17	11 A	6 A	11 P	.12	T
31	41.5	.283	94.0	S.S.W.	181	5.0	32	1 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during January was unusually variable ; ranging from midwinter conditions during the first part of the month to early spring conditions near the close of the month. The variations in temperature presented, resulted in a monthly range of temperature considerably larger than usual. The precipitation was considerably less than the normal and nearly all of it occurred during the first half of the month. A generally high barometer prevailed during the month and while there were a number of fluctuations of considerable magnitude, the range of pressure was only about two-thirds of the normal amount.

A comparison of the records for the month of the several weather elements with the normals for this station, shows the following characteristics of interest: The mean barometer was more than one-tenth of an inch above the normal and the highest January record since 1907. The maximum pressure was lower than usual and the minimum rather high, resulting in the small range referred to above. The total wind movement was about one-fourth more than the normal and numerous gales were recorded, Nearly all the wind was from the westerly points of the compass.

The mean temperature was more than three degrees above the normal, due to the comparatively high temperatures during the last third of the month. The maximum temperature was over six degrees higher than the normal value, while the minimum was two degrees higher. Zero temperature was reached on only three dates.

The mean dew point and relative humidity were both several points above the normal value.

The total precipitation was nine-tenths of an inch less than the normal and only five inches of snow occurred.

The records for sunshine and cloudiness were not far from average value.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 326. FEBRUARY, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.27, 14th, 1 P
Minimum reduced to freezing,	28.45, 25th, 12 P
Reduced† maximum reading,	30.60, 14th, 1 P
Reduced† minimum reading,	28.76, 25th, 12 P
Mean semi-daily reduced	30.005
Monthly range	1.84

***Air Temperature.** In Degrees Fahr.

Highest	47.5, 1st, 0 A
Lowest	−16.0, 15th, 9 A
Mean hourly	20.4
Mean of means of max. and min.	20.1
Mean sensible (wet bulb)	17.8
Monthly range	63.5
Highest mean daily	40.7, 1st
Lowest mean daily	1.3 15th
Mean maximum	28.6
Mean minimum	11.5
Mean daily range	17.1
Greatest daily range	39.5, 15th
Least daily range	5.5, 12th

Humidity.

Mean dew point	13.0
Mean force of vapor	.116
Mean relative humidity	79.9

Precipitation. In inches.

Total precipitation	5.27
Number of days on which .01 inch or more rain fell	14
Total snow in inches	16¾

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	5504 m
Greatest daily movement	519m, 28th
Least daily movement	37m, 17th
Mean daily movement	190 m
Mean hourly velocity	7.9 m

Maximum pressure per square foot, 16.0 lbs = 57 m per hour, 28th, 3 A, W.N.W.

Maximum velocity for 5 minutes, 36m per hour, 28th, 4 A, W.N.W.

Prevailing direction, West Northwest.

Summary.

North	14 per cent
South Southwest	10 " "
West	17 " "
West Northwest	10 " "
Northwest	21 " "
Other directions	28 " "

Weather.

Mean cloudiness observed	59 per cent
Total cloudiness recorded by the Sun Thermometer	156 hours = 53 per cent
Number of clear days	8
Number of fair days	9
Number of cloudy days	12

Bright Sunshine.

Number hours recorded, 140 hrs, = 47 per cent

Rain, 1st, 6th, 18th, 23d, 24th, 25th, 26th.

Hail, 23d.

Snow, 2d, 3d, 8th, 9th, 11th, 12th, 13th, 16th 17th, 18th, 23d, 26th, 27th.

Days of Sleighing, 28.

Gales, 35 or more miles per hour: 54m, 7th, W.N.W.; 47m, 8th, W.; 36m, 10th, W.; 51m, 19th, W.; 46m, 27th, W.N.W.; 57m, 28th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.28	29.83	30 092	47.5	0 A	31.5	12 P	39.5	40.7	38.7	0.0
2	30.39	30.17	30.311	31.5	0 A	19.5	12 P	25.5	24.2	22.7	0.1
3	30.28	30.03	30.104	27.0	2:30 P	16.5	12 P	21.7	21.1	19.0	5.3
4	30.47	30.28	30.418	24.5	3 P	9.5	8:30 A	17.0	15.7	11.5	9.2
5	30.38	30.11	30.234	30.0	10 P	11.5	7:30 A	20 7	21.8	18.7	4.9
6	30.15	29.78	30.021	40.0	3 P	18.5	9 A	29.3	30.9	28.3	3.3
7	30.06	29.60	29.769	37.5	10:30 A	14.5	12 P	26.0	27.6	24.3	2.8
8	30.40	30.06	30.319	26.0	11 A	12.5	4:30 A	19 3	18.2	16.0	6.7
9	30.31	30 03	30 103	30.5	10:30 A	15.0	3 A	22.7	22.2	21.3	4.5
10	30.34	30.05	30.201	30.5	10:30 A	21.0	12 P	25.7	26.9	25.3	8.3
11	30.47	30.30	30.394	22.0	1 P	9.5	8 A	15.7	17.3	12.5	4.4
12	30.35	30.12	30.236	18.5	0 A	13.0	10 P	15.7	16.6	15.0	0.0
13	30.49	30.25	30.350	20.0	3:30 P	6.5	12 P	13.3	14.6	12.7	0.0
14	30.60	30.49	30.379	12.5	3:30 P	−7.0	12 P	2.7	1.8	−3.0	7.8
15	30.54	30.20	30.328	23.5	5 P	−16.0	9 A	3.7	1.3	−3.3	7.8
16	30.16	29.85	29.993	30.5	5 P	−0.5	8 A	15.0	16.5	12.5	6.1
17	29.85	29.79	29.812	41.0	3 P	25.0	1 A	33.0	29.9	27.0	3.9
18	29.78	29 34	29.548	34.5	3 P	24.0	12 P	29.3	30.5	29.5	0.0
19	29.92	29.34	29.630	12.0	4 P	2.0	12 P	7.0	9.1	4.3	9.8
20	30.17	29 91	29.969	19.5	3 P	−4.0	5 A	7.7	10.0	8.3	5.7
21	30.50	29 88	30.401	13.0	4:30 P	−4.5	7:30 A	4.3	3.1	−1.7	10.0
22	30.30	29.87	30.108	37.5	4 P	−2.0	1 A	17.7	20.7	19.3	8.1
23	30.01	29.82	29.911	33.0	1 P	21.5	7 A	27.3	27.5	29 3	0 0
24	30.24	29 88	30.120	31.5	2:30 P	17.5	8 A	24 5	26.5	21 7	3.7
25	29.88	28.76	29.354	42.5	7 P	29.5	0 A	36.0	36.5	36.5	0 0
26	29.37	28.76	29 151	38.5	3 A	25.5	12 P	32.0	31.5	29 7	0.0
27	29.41	29 24	29.311	25.5	0 A	10.0	12 P	17.7	17.2	14.3	8.6
28	29.81	29.41	29 669	21.0	2 P	7.0	3 A	14.0	12.9	11.5	8.2
29	30.03	29.81	29.913	29.0	4 P	7.5	3:30 A	18.3	17.7	15.5	10.3

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	36.5	.251	85.0	N.W.	169	4.5	30	4 P	0 A	5 A	.04	
2	20.5	.128	90.0	N.W.	230	3.5	26	5 P	7 A	12 P	.12	$\frac{3}{4}$
3	16.0	.110	86.0	W.N.W.	280	5 5	33	4 P	0 A	5 P	.20	$1\frac{1}{4}$
4	7.5	.081	78.0	W.S.W.	223	2.5	22	1 P				
5	14.0	.118	76.0	S.	86	2.0	20	3 P				
6	25.5	.171	87.5	S.S.W.	75	1.0	14	3 P	8 P		T	
7	21.0	.147	84.0	W.	309	14.5	54	3 P				
8	10 0	.101	70.0	W.	233	11.0	47	5 A	8 P	12 P	.12	$1\frac{1}{2}$
9	19.0	.122	86.5	E.S.E.	189	0.5	10	1 A	0 A	5 A	.06	$\frac{1}{2}$
10	23.5	.143	88 0	W.	235	6.5	36	9 A				
11	8.0	.086	75.5	W.S.W.	140	2.0	20	4 A	2 P	12 P	.48	$2\frac{3}{4}$
12	12.0	.088	81.0	N.N.W.	92	1.5	17	11 P	0 A	12 P	.79	$4\frac{1}{4}$
13	10.0	.083	86.0	N.	350	5.0	32	7 P	0 A	7 P	.83	$4\frac{1}{2}$
14	−20 5	.043	38.5	N.	235	5.0	32	10 A				
15	−34.5	.049	38.5	N.N.E.	38	0 0	—	—				
16	8.5	.098	82 5	S E.	44	0.5	10	5 P	9 P	12 P	.08	$\frac{3}{4}$
17	26.0	.154	44.5	S.S.W.	37	0.0	—	—	0 A		T	T
18	27.5	.172	87.5	N.W.	44	4.0	28	12 P	2 P	9 P	.19	$\frac{1}{2}$
19	−5 5	.059	58.5	N.W.	420	13.0	51	4 P				
20	3.0	.072	76.0	S.W.	138	4.0	28	4 P				
21	−6.5	.043	75.0	W.	133	4.0	28	6 A				
22	14 0	.124	76.0	S.S.W.	178	3.5	26	12 M				
23	23.5	.143	88.0	W.	70	1.0	14	3 P	12 M	3 P	.21	T
24	19.0	.128	80 0	N.	120	1.0	14	12 P	12 M	12 P	.27	
25	35 5	.221	95.5	N.	218	2.5	22	4 A	0 A	12 P	1.14	
26	28 0	.173	89.5	N.W.	224	3.0	24	6 P	0 A	1 P	.74	T
27	11.5	.089	86.5	W.N.W.	384	10.5	46	12 P	6 P		T	T
28	10.5	.075	93.0	W.N.W.	519	16.0	57	3 A				
29	12.5	.095	84.0	N.W.	91	3.0	24	4 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

During February the weather was cold and wintry without exception. The highest temperature was recorded at the beginning of the first day of the month, and zero temperature was reached on several dates. Following the high temperature which prevailed during the last part of January, the low temperature of the month was especially noticeable. The precipitation was large, especially the snowfall, and sleighing was continuous after the first day. The snow storm of the 11th—13th was one of the heaviest in recent years here.

An examination of the records of the several weather elements shows the following as the most important features. The mean barometer was nearly normal and the range unusually large, owing to the very low minimum record. Owing to the breaking of the Draper barometer, the maximum and minimum pressures, after the 11th, were taken from a barograph, and are not as precise as the Draper records. The marked barometric activity resulted in a total wind movement considerably more than the normal.

The mean temperature was nearly four degrees lower than the normal and more than seven degrees lower than the mean of the preceding month. The minimum temperature was about eight degrees lower than the normal value for this feature and gave a large range for the month.

The mean dew point was about four degrees below the normal and the relative humidity slightly higher than usual.

The total precipitation was two inches more than the normal, and was well distributed throughout the month. The amount of cloudiness was considerably more than usual.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 327. MARCH, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.12, 2d, 3 A
Minimum reduced to freezing,	28.87, 8th, 12 P
Reduced† maximum reading,	30.44, 2d, 3 A
Reduced† minimum reading,	29.19, 8th, 12 P
Mean semi-daily reduced	29.955
Monthly range	1.25

***Air Temperature.** In Degrees Fahr.

Highest	66.0, 31st, 3:30 P
Lowest	0.0, 11th, 11 P
Mean hourly	26.4
Mean of means of max. and min.	26.8
Mean sensible (wet bulb)	25.2
Monthly range	66.0
Highest mean daily	49.0, 30th
Lowest mean daily	10.0 17th
Mean maximum	36.7
Mean minimum	16.9
Mean daily range	19.8
Greatest daily range	43.5, 26th
Least daily range	8.0, 9th

Humidity.

Mean dew point	22.4
Mean force of vapor	.156
Mean relative humidity	86.8

Precipitation. In inches.

Total precipitation	3.97
Number of days on which .01 inch or more rain fell	12
Total snow in inches	22

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	5536 m
Greatest daily movement	461m, 16th
Least daily movement	18m, 27th
Mean daily movement	147 m
Mean hourly velocity	6.1 m

Maximum pressure per square foot, 10.0 lbs = 45 m per hour, 9th, 12 M, W.

Maximum velocity for 5 minutes, 30m per hour, 9th, 1¼P, W.

Prevailing direction, West.

Summary.

North Northwest	13 per cent
North	13 " "
West	19 " "
Northeast	10 " "
South Southwest	10 " "
West Northwest	16 " "
Other directions	19 " "

Weather.

Mean cloudiness observed	43 per cent
Total cloudiness recorded by the Sun Thermometer	154 hours = 42 per cent
Number of clear days	15
Number of fair days	8
Number of cloudy days	8

Bright Sunshine.

Number hours recorded, 217 hrs, = 58 per cent

Rain, 5th, 6th, 7th.

Snow, 2d, 5th, 6th, 7th, 8th, 9th, 10th, 13th, 14th, 15th, 19th, 21st, 22d.

Days of Sleighing, 29.

Gales, 35 or more miles per hour: 39m, 1st, N.N.W.; 40m, 4th, W.N.W.; 38m, 5th, W.N.W.; 45m, 9th, W.; 35m, 10th, S.S.W.; 35m, 13th, W.N.W.; 38m, 16th, N.W.; 37m, 23d, W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean, Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.41	29.97	30.275	28.5	5 P	11.0	6:30 A	19.7	19.8	17.3	9.6
2	30.44	30.04	30.119	24.0	4 P	14.0	9 A	19.0	19.8	18.7	0.7
3	30.09	30.04	30 067	29.5	3:30 P	18.5	5 A	24.0	22.5	19.7	9.4
4	30.10	29.71	29.929	26.0	2 P	12.5	10 P	19 3	19 9	16.3	9.8
5	30.32	29.65	29 960	25.0	1 P	12.0	12 P	18.5	17 6	14.3	8.3
6	30.31	30.19	30.285	23.0	10:30 A	6.0	4 A	14.5	17.0	18.0	6.0
7	30.19	29.57	29.607	31.5	1 P	17.5	0 A	24.5	27.5	28.0	0.4
8	29.61	29.19	29.391	31.0	0 A	18.5	11 P	24.7	25.5	23.3	0.0
9	29.89	29 19	29 681	27.0	8 A	19 0	0 A	23.0	22.2	22.0	6.5
10	29.86	29.56	29.701	31.0	11 A	17.0	12 P	24 0	23.7	23.3	2.7
11	30.25	29.86	30.064	26.5	1 P	0.0	11 P	13.3	18.2	18.0	10.5
12	30.20	29.92	30.091	34.0	8 A	3.5	0 A	18.7	28.3	31.3	9.1
13	29.92	29.50	29.641	39.0	4 P	27.5	12 P	33.3	33.0	31.7	6.7
14	29.98	29.87	29.974	38.0	1 P	25.5	5 A	31.7	21.0	28.5	3.6
15	30.03	29 94	29.991	30.0	0 A	15.0	9 A	22.5	17 8	16.3	0.0
16	29.97	29.79	29.844	24.5	7:30 A	7.0	12 P	15.7	16.0	15 7	9.5
17	30.06	29 86	29.949	20.0	1:30 P	1.5	4 A	10 7	10.0	8.7	10.5
18	30.20	30.07	30 156	22.0	4 P	2.5	0 A	12.3	11.9	11.0	8.8
19	30.11	29 81	29.979	29.0	4:30 P	10 0	6 A	19 5	19.0	17 0	9.5
20	30.22	30.05	30.178	27.0	2:30 P	18.0	9 A	22.5	22.3	19.5	9.6
21	29.97	29.63	29.823	36.5	4:30 P	20 0	4 A	28.3	27.0	25 7	7.4
22	29.63	29.45	29.687	38 0	1 P	12.5	7 A	25.3	22.3	20.5	0.0
23	30.06	29.45	29.918	35.0	2:30 P	16.0	3 A	25.5	25.4	26.5	10.7
24	30.13	30.05	30 095	40.0	2:30 P	12.0	5:30 A	26.0	27.9	25.0	8.5
25	30.21	30.03	30.127	55.0	2 P	23.5	6 A	39.3	38.6	35.7	10 7
26	30.13	30.04	30.120	65.0	4 P	21.5	7 A	43.3	41.7	41.3	11.4
27	30.14	30.00	30.070	63.5	4:30 P	30 0	6 A	46 7	42.2	40.3	8.5
28	30.04	29.86	29 946	58.5	4 P	26.5	7 A	42.5	42.0	40 0	8.9
29	29.98	29.88	29.944	50.0	3 P	31.5	4:30 A	40.7	41.8	39 5	0.4
30	30 09	29.98	30.036	64.0	3 P	40 0	3 A	52.0	49.0	43.7	8.9
31	30.11	30.01	30.066	66.0	3:30 P	35.5	5 A	50.7	48.4	44.3	10.8

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	13.5	.103	80.5	E.	108	7.5	39	10 A				
2	17.5	.108	92.0	N.N.W.	84	1.0	14	2 P	1 A	10 A	.08	½
3	16.5	.114	83.0	N.N.W.	174	3.5	26	10 A				
4	13.0	.098	80.0	W.N.W.	398	8.0	40	2 P				
5	10 0	.065	78.0	W.	215	7.0	38	4 P	11 A		T	T
6	16.0	.104	88.5	S.S.W.	92	1.5	17	4 P	3 P	12 P	.76	1
7	27.0	.156	94.5	N.N.W.	100	2.0	20	4 A	0 A	12 P	.08	¼
8	22.0	.134	84.5	N.	199	5.0	32	5 P	0 A	7 P	1.08	2¼
9	20.5	.124	92.5	W.	379	10.0	45	12 M	0 A	7 P	.17	½
10	21.5	.129	90.0	S.S.W.	294	6.0	35	12 M	3 A	10 A	.09	¼
11	17.0	.103	91.0	W.N.W.	142	4.0	28	9 A				
12	29.5	.180	92.5	W.	75	2.0	20	11 P				
13	30.5	.183	92.5	W.	294	6.0	35	10 A	2 A	8 A	.38	5¼
14	26.5	.163	89.5	N.N.W.	145	0.0	—	—	5 P	12 P	.27	3
15	15.0	.095	90.5	N.	354	3.5	26	2 A	0 A	11 P	.48	4½
16	12.0	.099	81.0	W.	461	7 0	38	4 P				
17	7.0	.068	92.0	W.N.W.	266	5.5	33	10 A				
18	8.5	.076	85.0	W.	108	0.5	10	10 A				
19	15.0	.103	91.0	W.N.W.	156	2.5	22	12 M	0 A	4 A	.04	¼
20	17.0	.113	85.5	W.S.W.	218	2.0	20	9 A				
21	23.5	.145	88.5	S.S.W.	107	1.0	14	10 A	0 A	11 A	.15	1¼
22	19 5	.114	95.5	N.W.	106	2.0	20	11 P	8 A	10 P	.39	3
23	18.5	.139	83.5	W.N.W.	375	7.0	37	10 A				
24	22.5	.146	87.5	W.S.W.	200	3.0	24	11 A				
25	34.0	.226	86.0	N.E.	99	4.5	30	1 P				
26	39.0	.285	86.5	N.	70	1.0	14	8 P				
27	37.5	.274	84.0	S.	18	0.0	—	—				
28	37.0	.272	81.0	E.S.E.	40	0.5	10	6 P				
29	36.0	.267	80.5	N.E.	95	4.0	28	10 A				
30	40 5	.313	82.0	N.E.	110	4.5	30	2 P				
31	41.5	.329	81.0	N.	74	1.0	14	8 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during March was in many respects the most wintry of the season. The snowfall was exceptionally large and traffic was blocked to a considerable extent. The temperature was much below the normal, in fact, the mean for the month was about average midwinter temperature. The total snowfall for the season was 56 inches—an unusually large amount. Shortly after the equinoctial date the weather turned warmer and by the end of the month nearly all the snow in this vicinity had disappeared without causing extremely high water. The total number of days of sleighing during the winter was about one hundred.

The mean barometer was comparatively low, and was smaller than usual. The maximum and minimum barometer up to the 25th are taken from barograph readings, after that the Draper barometer records are used.

The total wind movement was slightly below the normal although several high daily records were made. No extremely high velocities were recorded on the pressure chart. Up to the last week nearly all the wind was from the westerly points of the compass.

The mean hourly temperature was more than seven degrees below the normal, making it the coldest March since this station was established. Other low March records taken from Professor Snell's records at Amherst College are, 1888, 26.8; 1887, 26.4; 1863, 26.1; 1856, 25.9; 1843, 24.5. These however are taken from maximum and minimum daily readings. The range of temperature was unusually large owing to the high temperature at the close of the month.

The mean dewpoint was low owing to the low temperature of the month.

The total precipitation was nearly normal and nearly all of it occurred as snow. The snowfall of 22 inches was the largest of any month of the winter. The amount of sunshine was considerably more than the normal.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 328. APRIL, 1916

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.97, 16th, 9 A
Minimum reduced to freezing,	29.03, 8th, 11 P
Reduced† maximum reading,	30.27, 16th, 9 A
Reduced† minimum reading,	29.34, 8th, 11 P
Mean semi-daily reduced	29.917
Monthly range	0.94

***Air Temperature.** In Degrees Fahr.

Highest	73.5, 30th, 3 P
Lowest	28.0, 3d, 6:30 A
Mean hourly	43.9
Mean of means of max. and min.	44.6
Mean sensible (wet bulb)	40.5
Monthly range	45.5
Highest mean daily	56.3, 30th
Lowest mean daily	32.5 9th
Mean maximum	54.1
Mean minimum	35.1
Mean daily range	19.0
Greatest daily range	40.0, 16th
Least daily range	3.5, 4th

Humidity.

Mean dew point	37.4
Mean force of vapor	.283
Mean relative humidity	81.2

Precipitation. In inches.

Total precipitation	3.69
Number of days on which .01 inch or more rain fell	11
Total snow in inches	4¾

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	4836 m
Greatest daily movement	424m, 15th
Least daily movement	38m, 20th
Mean daily movement	161 m
Mean hourly velocity	6.7 m

Maximum pressure per square foot, 18.5 lbs = 61 m per hour, 15th, 10 A, N.

Maximum velocity for 5 minutes, 48m per hour, 15th, 10 A, N.

Prevailing direction, West.

Summary.

Northeast	17 per cent
East	13 " "
West	20 " "
Northwest	10 " "
Other directions	40 " "

Weather.

Mean cloudiness observed	65 per cent
Total cloudiness recorded by the Sun Thermometer	279 hours = 69 per cent
Number of clear days	5
Number of fair days	8
Number of cloudy days	17

Bright Sunshine.

Number hours recorded, 123 hrs, = 31 per cent

Rain, 1st, 4th, 6th, 12th, 13th, 14th, 17th, 21st, 22d, 23d, 24th, 26th, 27th, 28th.

Snow, 4th, 6th, 8th, 9th, 14th.

Hail, 9th.

Frosts, after the 15th—28th.

Gales, 35 or more miles per hour: 35m, 2d, N.W.; 39m, 7th, W.N.W.; 40m, 9th, N.; 35m, 12th, N.; 61m, 15th, N.; 43m, 18th, N.W.; 39m, 19th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.13	29.79	29.913	65.0	1:30 P	36.0	6:30 A	50.5	48.7	43.7	6.6
2	30.09	29.79	29.924	49.0	5 P	35.5	12 P	42.3	43.8	40.0	4.1
3	30.22	30.09	30.208	55.5	4:30 P	28.0	6:30 A	41.7	39.9	33.0	8.7
4	30.23	29.98	30.145	37.0	1 A	33.5	6 A	35.3	34.0	32.3	0.0
5	30.04	29.87	29.973	54.0	2 P	32.5	0 A	43.3	42.4	38.7	8.6
6	30.04	29.82	29.939	58.5	3 P	29.5	3:30 A	44.0	42.2	39.0	6.3
7	30.11	29.87	29.982	45.5	3 P	31.5	12 P	38.5	37.1	33.0	6.3
8	30.08	29.34	29.719	43.0	2 P	28.5	5 A	35.7	34.1	31.3	0.0
9	29.64	29.38	29.472	37.5	3:30 P	29.0	5 A	33.3	32.5	31.3	1.4
10	30.12	29.64	30.010	50.0	3 P	29.5	6 A	39.7	39.3	35.7	9.2
11	30.24	29.91	30.108	60.0	3 P	28.5	5:30 A	44.3	45.1	40.0	9.2
12	30.06	29.82	29.935	54.0	4:30 P	39.5	8 A	46.7	45.1	40.7	1.0
13	30.06	29.87	29.945	52.5	1 P	35.0	6 A	43.7	43.1	40.3	0.1
14	29.87	29.36	29.573	39.0	0 A	31.5	12 P	35.3	35.0	34.0	0.0
15	30.17	29.60	30.004	54.0	4:30 P	31.5	0 A	42.7	43.1	39.3	10.8
16	30.27	30.08	30.181	70.0	3:30 P	30.0	5:30 A	50.0	50.2	46.3	10.0
17	30.08	29.71	29.831	68.5	12 M	40.0	4 A	54.3	48.5	46.7	1.3
18	29.71	29.59	29.662	46.5	3:30 P	38.5	5 A	42.3	42.8	40.3	0.0
19	30.05	29.70	29.946	61.5	4 P	36.0	6 A	48.7	47.2	42.7	10.9
20	30.10	29.93	30.035	64.0	4 P	38.0	2:30 A	51.0	49.8	45.3	2.9
21	29.97	29.82	29.881	59.5	3 P	44.5	6 A	52.0	50.2	46.3	1.6
22	29.84	29.70	29.759	48.0	11:30 P	39.5	12 P	43.7	44.4	40.7	0.0
23	29.70	29.68	29.683	43.0	8 P	39.0	4 A	41.0	41.3	40.3	0.0
24	29.92	29.69	29.840	51.5	3 P	41.0	3 A	46.3	45.0	43.0	0.5
25	29.89	29.73	29.841	63.0	2 P	35.0	5:30 A	49.0	48.5	43.7	6.3
26	29.94	29.76	29.871	53.0	4 P	40.5	6 A	46.7	46.0	43.7	0.6
27	29.99	29.95	29.986	54.0	12 M	39.0	4 A	46.5	48.2	46.0	0.2
28	30.05	29.98	30.018	43.5	3:30 P	37.5	8 A	40.5	40.5	37.5	0.0
29	30.09	29.95	30.058	69.5	3 P	34.5	5 A	52.0	53.2	50.0	8.1
30	30.10	29.95	30.071	73.5	3 P	41.0	6 A	57.3	56.3	51.0	8.3

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	39 5	.313	80.5	S.	138	5.0	32	8 P	11 P		T	
2	36.5	.274	79.0	W.N.W.	264	6.0	35	3 P				
3	26.5	.218	67.0	W.S.W.	85	2.0	20	7 P				
4	30.0	.193	85.0	E.	106	1.0	14	12 P	2 A	3 P	.11	T
5	35.0	.258	82.0	N.W.	158	3.0	24	2 P				
6	33.5	.271	78.0	S.W.	115	3.5	26	6 P	8 P	11 P	.06	T
7	29 0	.186	75.5	W.	298	7.5	39	2 P				
8	29.0	.185	85.0	E.	168	2.0	20	5 P	8 P	12 P	.24	2
9	30.0	.180	92 5	N.N.W.	228	8.0	40	1 P	0 A	10 P	.27	2¾
10	31.5	.236	75.0	W.	204	4 5	30	4 P				
11	32 0	.309	59.5	S.S.W.	285	5.0	32	5 P				
12	38.0	.277	83 5	W.	245	6.0	35	10 A	1 A	7 A	.04	
13	38.5	.264	88.0	W.	55	1.5	17	4 P	11 A	7 P	.03	
14	33.0	.202	93.0	N.	67	3.0	24	11 P	6 A	11 P	.76	T
15	34.0	.279	69.5	N.N.W.	424	18.5	61	10 A				
16	45.0	.333	90.0	S.W.	78	2.0	20	6 P				
17	45 5	.336	91.5	W.	165	1.5	17	11 A	11 A	9 P	.06	
18	37.5	.276	79.5	W.	282	9.0	43	2 P				
19	37.5	.322	70 0	N.W.	369	7 5	39	1 P				
20	42.5	.328	86.0	W.S.W.	38	1.5	17	5 P				
21	43.5	.340	83.0	N.W.	69	0.5	10	4 P	5 A	9 A	.03	
22	37 0	.289	75.0	N.E.	89	1.0	14	10 A	6 A	12 P	.20	
23	38.5	.263	90.0	N.E.	128	1.5	17	2 P	0 A	11 P	1.29	
24	41.0	.295	86.5	N.N.E.	201	2.5	22	2 P	8 A	11 A	.07	
25	41.0	.313	82.0	N.E.	67	2.5	22	4 P				
26	41.5	.309	84.0	E.	87	0.5	10	2 P	8 A	9 A	T	
27	43.0	.353	79.5	N.E.	92	1.5	17	2 P	11 P	12 P	T	
28	34.5	.240	85.0	N.E.	149	2 5	22	10 A	0 A	9 P	.53	
29	47.0	.417	79 0	N.	87	2.5	22	11 A				
30	48.5	.419	82 0	E	95	2.5	22	2 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was considerably colder than usual, following the wintry conditions that prevailed in March. Much cloudiness, a considerable snowstorm, and a rather large precipitation, all tended to retard the season's progress, so that at the close of the month the seasonal advancement was about two weeks behind normal conditions. The mean hourly temperature was above fifty degrees on only four days of the month.

Comparing the records of the several weather elements with the normals at this station, tha following features are noted: The mean barometer was unusually low and the range considerably less than usual. The small fluctuations in pressure resulted in a total wind movement about ten per cent less than the normal. The wind directions were more variable than usual.

The mean temperature was more than two degrees below the normal and the monthly range the smallest for April since this station was established. The minimum temperature was more than six degrees higher than the normal for this feature. Only a trace of frost was noted after the middle of the month.

The mean dewpoint and relative humidity were both unusually high, owing to the many days on which precipitation occurred.

The total precipitation was about twenty per cent more than normal and included a snowstorm of nearly five inches.

The amount of sunshine was nearly one hundred hours less than usual.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 329. MAY, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.02, 14th, 8 A
Minimum reduced to freezing,	28.92, 17th, 3 P
Reduced† maximum reading,	30.32, 14th, 8 A
Reduced† minimum reading,	29.22, 17th, 3 P
Mean semi-daily reduced	29.907
Monthly range	1.10

***Air Temperature.** In Degrees Fahr.

Highest	81.5, 29th, 2:30 P
Lowest	36.0, 10th, 4:30 A
Mean hourly	55.9
Mean of means of max. and min.	56.2
Mean sensible (wet bulb)	50.4
Monthly range	45.5
Highest mean daily	67.4, 29th
Lowest mean daily	46.8 18th, 23d
Mean maximum	66.7
Mean minimum	45.7
Mean daily range	21.0
Greatest daily range	36.5, 21st
Least daily range	5.0, 23d

Humidity.

Mean dew point	45.1
Mean force of vapor	.448
Mean relative humidity	71.9

Precipitation. In inches.

Total precipitation	3.21
Number of days on which .01 inch or more rain fell	12

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	4893 m
Greatest daily movement	449m, 11th
Least daily movement	45m, 16th
Mean daily movement	158 m
Mean hourly velocity	6.6 m

Maximum pressure per square foot, 19.0 lbs = 62 m per hour, 12th, 1 A, W.N.W.

Maximum velocity for 5 minutes, 36m per hour, 11th, 1 P, S.S.W.

Prevailing direction, West Southwest.

Summary.

North Northwest	10 per cent
South Southwest	26 " "
West	19 " "
West Northwest	13 " "
Other directions	32 " "

Weather.

Mean cloudiness observed	53 per cent
Total cloudiness recorded by the Sun Thermometer	272 hours = 60 per cent
Number of clear days	4
Number of fair days	14
Number of cloudy days	13

Bright Sunshine.

Number hours recorded, 191 hrs, = 40 per cent

Rain, 2d, 4th, 6th, 7th, 8th, 15th, 16th, 17th, 23d, 24th, 27th, 28th, 29th, 30th.

Thunder and Lightning, 4th, 8th, 28th, 30th.

Frosts, 19th.

Gales. 35 or more miles per hour: 35m, 2d, N.; 47m, 8th, S.S.W.; 40m, 9th, W.S.W.; 61m, 11th, W.; 62m, 12th, W.N.W.; 42m, 17th, N.W.; 35m, 25th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.09	29.89	30.008	69.5	3 P	39.5	6 A	54.5	53.3	46.3	7.3
2	30.03	29.84	29.934	66.5	3 P	44 0	4 A	55.3	54.3	48.7	6.6
3	30.07	29 69	29.885	62 5	1:30 P	39 0	4 A	50.7	52.0	47.3	0.7
4	29.93	29 67	29 892	66.0	3 P	46.5	12 P	56.3	55.3	49.5	9.1
5	29.93	29.80	29 843	68 5	4 P	42.0	5 A	55.3	55.1	50.0	3.2
6	29.85	29 74	29.816	74.5	5 P	51.0	3 A	62.7	60.3	54.3	7.9
7	29.79	29 65	29.751	64 0	4:30 P	51.0	4:30 A	57.5	56.5	51.3	0.1
8	29 88	29 51	29.728	74.0	2:30 P	49.0	6 A	61.5	59.8	46.3	5.9
9	29 90	29 55	29.731	59.5	0 A	42.0	12 P	50.7	52.5	45.7	4.0
10	30.04	29 65	29.888	71.5	3:30 P	36.0	4:30 A	53.7	52.1	45.3	0.8
11	29.76	29.48	29 585	74.5	3 P	50.0	1 A	62 3	64.9	59.5	9.8
12	30.20	29 76	30.050	60 0	4:30 P	45.0	7 A	52.5	51.9	44.3	9 9
13	30.27	30.12	30 216	67.0	5 P	41.5	5:30 A	54.3	55.0	47.7	11.1
14	30 32	30 21	30 266	64.0	3:30 P	36.5	5 A	50.3	53.4	48.7	5.0
15	30.23	30 10	30.131	54.5	6 P	45.0	3 A	49 7	49.6	43 5	0.0
16	30.10	29.74	29 939	54.0	2 P	45.0	10:30 P	49.5	49.1	43.7	0.0
17	29.74	29.22	29.407	51.5	3 P	46.0	12 P	48.7	48.3	46.3	0.0
18	29.84	29.48	29 690	51.5	4 P	41.5	12 P	46.5	46 8	40.7	1.2
19	30.03	29.84	29.959	63.5	5 P	37 0	4:30 A	50.3	50.9	46 3	10.4
20	30.05	29.98	30.030	64.0	2 P	46 0	12 P	55.0	53.5	48.7	7.9
21	30.13	30 01	30 042	76.0	3:30 P	39 5	4 A	57.7	59.0	53.3	11.7
22	30.23	30.13	30 210	71.0	2 P	42.5	4:30 A	56 7	55.8	49.3	8.6
23	30.18	30.06	30.114	50.0	4 P	45 0	3 A	47 5	46.8	45 7	0 0
24	30.06	29.85	29.960	76.0	4:30 P	49.0	0 A	62.6	60.6	56.3	7 6
25	29 85	29.62	29 730	80.0	2:30 P	52 0	5 A	66.0	65.2	60 0	11.6
26	29 95	29.71	29.865	73 0	4 P	53.5	12 P	63 3	63.0	57.3	12.1
27	30.08	29.95	30 041	74 0	1:30 P	44.0	5 A	59 0	60.2	56.3	7.9
28	30 07	29.88	29.968	62.5	5 P	52.5	6 A	57.5	57.4	54.7	0 0
29	29.88	29 77	29 845	81.5	2:30 P	55 0	2 A	68.3	67.4	60.3	7.9
30	29.77	29.50	29.650	70.5	4:30 P	58 5	12 P	64 5	63.9	59.7	0.5
31	30.01	29.62	29.863	71.0	4 P	52.5	12 P	61 7	60.8	54.5	12.1

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	41.5	.374	69.5	S.S.W.	147	2.5	22	4 P				
2	46.0	.392	80.0	W.	184	6.0	35	11 A	8 A		T	
3	44.0	.380	75.0	W.	101	1.5	17	8 P				
4	47.0	.402	78.5	W.N.W.	180	3.0	24	1 P	1 A	6 A	.04	
5	45 5	.439	71.0	W.S.W.	51	0.5	10	6 P				
6	52.0	.478	83 5	W.N.W.	132	2.0	20	12 M	0 A	7 A	.22	
7	47.5	.453	72.0	S.S.W.	123	2.0	20	2 P	8 A	12 P	.19	
8	47.5	.461	70.0	S S.W.	188	11.0	47	2 P	0 A	7 P	.12	
9	39 5	.407	56 0	N.W.	316	8.0	40	6 A				
10	40.5	.371	66.5	S.S.W.	219	5.5	33	6 P				
11	53 0	.680	61.0	W.	449	18.5	61	3 P				
12	39.5	.345	70.5	W.N.W.	446	19.0	62	1 A				
13	40.5	.440	57.0	W.S.W.	165	5.0	32	4 P				
14	42.0	.424	61.0	W.	113	1.5	17	8 P				
15	37 0	.359	61.0	S.	64	0.5	10	10 P	1 A	12 P	.23	
16	40.0	.336	71.5	E.N.E.	45	0.5	10	11 P	0 A	12 P	.96	
17	44.0	.345	83.5	N.N.W.	227	9.0	42	4 P	0 A	3 P	.73	
18	34 0	.310	62 0	W.	265	2.5	22	10 A				
19	39.5	.392	62.0	W N.W.	120	2.0	20	2 P				
20	44.5	.407	74.0	N.N.W.	131	3.5	26	3 P				
21	47.5	.527	61 5	N.	141	5 5	33	8 A				
22	43 0	.425	76.5	S.S.W.	187	4.0	28	3 P				
23	47.5	.331	88.5	S.S.W.	182	2.0	20	6 A	1 A	12 P	.44	
24	57.0	.544	69 5	S.S.W.	65	1.0	14	3 P	0 A	6 A	.10	
25	57.5	.618	77.5	W.	229	6.0	35	4 P				
26	54 0	.570	73.0	N.	145	3.0	24	10 A				
27	53.0	.532	76.5	E.	114	1.5	17	6 P	3 P		T	
28	54.0	.465	88.5	S.	75	0.0	—	—	1 A	12 P	.06	
29	57 0	.622	75.0	S.W.	50	0.0	—	—	0 A	7 A	.03	
30	58.5	.565	84.5	S.S.W.	188	2.0	20	3 P	1 A	7 P	.09	
31	50.5	.512	71.5	N.N.W.	278	3.5	26	8 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was considerably cooler than usual and the backward condition of the season which was noted at the beginning of the month was not materially changed. Deficiency in sunshine, combined with relatively low temperatures, materially retarded the season's progress.

The records of the various weather elements show the following features of interest: The mean barometer was the lowest for fifteen years and the range more than twenty per cent greater than usual. Notwithstanding the rather large fluctuations in pressure the total wind movement was only about the normal amount. Winds from the southwest quadrant predominated.

The mean hourly temperature was slightly below the normal. The range of temperature was unusually small, due to a low maximum and a high minimum. The maximum reading was more than five degrees lower than usual and the minimum was a like amount higher than usual. Owing to the high minimum records there was no frost excepting on a single date and that was scarcely more than a trace.

The mean dew point was slightly lower than usual, while the relative humidity was nearly normal.

The total precipitation was about half an inch less than the normal. There was one heavy rainfall about the middle of the month, when sixty per cent of the total for the month was recorded.

The amount of bright sunshine was about eighty per cent of the normal.

J. E. OSTRANDER, Meteorologist.

DAVID POTTER, Observer.

BULLETIN No. 330. JUNE, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.83, 16th, 11 A
Minimum reduced to freezing,	29.31, 3d, 12 P
Reduced† maximum reading,	30.13, 16th, 11 A
Reduced† minimum reading,	29.61, 3d, 12 P
Mean semi-daily reduced	29.945
Monthly range	0.52

***Air Temperature.** In Degrees Fahr.

Highest	84.0, 28th, 3 P
Lowest	40.0, 2d, 4:30 A
Mean hourly	61.1
Mean of means of max. and min.	61.3
Mean sensible (wet bulb)	57.0
Monthly range	44 0
Highest mean daily	72.0, 28th
Lowest mean daily	49.8 10th
Mean maximum	71.3
Mean minimum	51.2
Mean daily range	20.1
Greatest daily range	40.5, 2d
Least daily range	5.0, 9th

Humidity.

Mean dew point	53.3
Mean force of vapor	0.556
Mean relative humidity	75.7

Precipitation. In inches.

Total precipitation	5.34
Number of days on which .01 inch or more rain fell	13.0

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	3226 m
Greatest daily movement	229m, 22d
Least daily movement	23m, 16th
Mean daily movement	108 m
Mean hourly velocity	4.5 m

Maximum pressure per square foot, 7.0 lbs = 37 m per hour, 22d, 11 A, N.W.

Maximum velocity for 5 minutes, 24m per hour, 22d, 12 M, N.W.

Prevailing direction, Northeast.

Summary.

North Northwest	10 per cent
North Northeast	10 " "
South	17 " "
Northeast	10 " "
West Northwest	10 " "
Other directions	43 " "

Weather.

Mean cloudiness observed	62 per cent
Total cloudiness recorded by the Sun Thermometer	301 hours = 66 per cent
Number of clear days	4
Number of fair days	10
Number of cloudy days	16

Bright Sunshine.

Number hours recorded, 156 hrs, = 34 per cent

Rain, 3d, 5th, 7th, 8th, 9th, 11th, 12th, 13th, 16th, 17th, 18th, 19th, 21st, 25th.

Thunder and Lightning, 1st, 5th, 12th, 13th, 18th.

Frosts.

Gales, 35 or more miles per hour. 36m, 4th, N.W.; 37m, 22d, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximun.	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.08	30.01	30.057	76.0	4:30 P	41.5	5 A	58.7	60 2	51.7	13.5
2	30.11	29.92	30.013	80.5	3:30 P	40.0	4:30 A	60.3	63 0	53.5	13.6
3	29.94	29 61	29 748	67.0	1 P	51.5	4:30 A	59 3	58.1	54 0	0.0
4	29.77	29.61	29.701	72.0	3 P	50.5	5:30 A	61.3	61.5	55.3	11.7
5	29.81	29.73	29.773	73.0	11 A	49.0	5 A	61.0	57.5	57.7	3.5
6	29.95	29.81	29 896	76.0	2:30 P	50.0	6 A	63.0	61.2	57.0	7.3
7	29.96	29.92	29.937	67.0	2:30 P	51.5	3:30 A	59 3	60.5	56.0	0.8
8	30.07	29.94	30.023	60 0	3 P	54.5	1 A	57.3	56 7	54.5	0 0
9	30.10	30.05	30.101	54.5	11 A	49.5	5:30 A	52.0	50.6	49 5	0.0
10	30.09	30 01	30.079	54 0	3 P	46.5	2 A	50.3	49 8	49.3	0 0
11	30.03	29.96	30.003	60.0	1 P	50 0	2 A	55.0	54.8	52.7	0 0
12	29 96	29 91	29 964	74 5	6 P	55.0	5 A	64.7	62 6	58.5	5.5
13	29.98	29 87	29 960	78.5	1:30 P	50 0	5 A	64 3	63.7	58.3	8.8
14	30.06	29 98	30.025	73.5	4:30 P	52 5	6 A	63.0	63 0	57.5	6.0
15	30.09	30 02	30.071	63.0	4 P	54.0	12 P	58.5	58.3	54.3	0.0
16	30 13	29.99	30.070	65.0	4:30 P	52.0	6 A	58 5	57.5	55 7	0.0
17	29 99	29.83	29.862	69.0	4 P	59.0	4 A	64.0	64.2	62.5	0.0
18	29.86	29.74	29.830	77.0	1:30 P	60.0	12 P	68.5	65.9	57.7	4.7
19	29 85	29 68	29.762	67.5	11:30 A	51.5	4:30 A	59.5	60.4	59.5	2.2
20	29.93	29.68	29.821	65.0	2:30 P	47 0	12 P	56 0	57.6	55.3	4 3
21	29.96	29.87	29.915	72.0	1:30 P	43 0	5:30 A	57 5	57.3	54.7	7.1
22	29.97	29 89	29.918	68 5	1:30 P	46.5	5 A	57.5	59.0	53.0	8.3
23	29.95	29.90	29.932	75.5	1 P	44 0	3 A	59 7	61.9	56.7	8 0
24	30.01	29 94	29.978	78.5	3 P	46.5	3:30 A	62.5	62.7	59.7	9.2
25	29.98	29 91	29.959	64.5	10 A	57 5	5 A	61.0	64.5	61.5	0.0
26	30.02	29.95	30 013	81.5	4:30 P	56.5	5 A	69.0	68 5	63.7	12.8
27	30.04	29.95	30.012	82.5	3 P	56.5	5 A	69.5	68.5	63.0	6.3
28	29.98	29.90	29 947	84.0	3 P	65 0	5 A	74.5	72.0	66.0	8.5
29	30.02	29 93	29.973	79 5	1:30 P	53.5	5 A	66 5	66.7	59.7	7.5
30	30.05	29 96	30.021	79.5	4 P	51.5	5 A	65.5	66.0	58.7	14.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	45.0	.511	58.5	N.N.W.	126	4.0	28	8 A				
2	44.0	.586	49.5	S.	43	3.0	24	6 P				
3	50.0	.490	75.0	S.	127	3.5	26	12 M	1 P	12 P	.36	
4	48.5	.593	58.0	W.N.W.	165	6.5	36	10 A				
5	55.0	.552	79.5	N.N.E.	87	5.0	32	12 M	11 A	7 P	.60	
6	54.0	.526	80 5	N.E.	84	2.0	20	3 P				
7	51.5	.537	73.0	E.	133	3.0	24	12 M	8 P	11 P	.08	
8	53.5	.455	89.5	E.	126	1.5	17	12 P	8 P	12 P	.07	
9	48.0	.369	91.5	N.E.	139	1.5	17	0 A	0 A	3 P	.20	
10	47.0	.376	86 5	N.E.	142	0.5	10	1 P				
11	51.0	.435	86.0	E.N.E.	23	1.0	14	11 P	1 P	3 P	.40	
12	56 0	.543	84.0	N.N.E.	41	4.5	30	7 P	2 P	7 P	.50	
13	55 0	.565	77.5	N.N.E.	75	2.5	22	4 P	2 P	9 P	.50	
14	54.0	.560	75 5	S.S.E.	51	0.5	10	6 P				
15	51 0	.485	77.5	E.S.E.	138	1.0	14	5 P				
16	54 0	.484	88.5	E.S.E.	92	1.5	17	11 P	5 A	12 P	.30	
17	61 5	.593	93.5	S.S.E.	201	2.0	20	12 M	0 A	8 P	1.16	
18	53 0	.602	67.5	S.	77	2.5	22	2 P	3 P		T	
19	57.0	.586	80.5	S.	29	1.0	14	2 P	10 A	10 P	.37	
20	51.0	.533	70.5	W.N.W.	150	5.0	32	2 P				
21	51 5	.498	78.0	W.N.W.	68	0.5	10	1 P	4 P	8 P	.15	
22	46 0	.528	60 5	N.W.	229	7.0	37	11 A				
23	52.5	.579	68 0	N.N.W.	137	2.5	22	1 P				
24	57.0	.612	77.0	S.S.W.	64	1.0	14	7 P				
25	60.0	.597	87 0	S.S.W.	97	0.0	—	—	4 A	9 P	.65	
26	60.5	.699	78.5	W.S.W.	63	1.0	14	12 M				
27	60.0	.674	78.0	S.	167	2.0	20	2 P				
28	63.5	.723	82.5	W.	105	0.5	10	4 P				
29	55.0	.674	63.5	N.W.	116	1.5	17	6 P				
30	52.0	.708	55.5	N.N.W.	131	3.5	26	5 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during June was unusually cold and stormy, especially the first half of the month. The backward condition of vegetation which existed at the beginning of the month was not materially changed during the month owing to the adverse features which existed. On only a few days was really warm weather recorded.

A comparison of the records of the several weather elements with the normals shows the following features of interest: The mean barometer was practically normal while the range of pressure was only about two-thirds of the usual amount. Owing to the small fluctuations of pressure the total wind movement was comparatively small. The prevailing wind direction in the Northeast was a very unusual feature for this locality.

The mean hourly temperature was about five degrees below the normal and the lowest since 1903. The maximum temperature was more than seven degrees lower than usual and the lowest June record for that feature since this station was established. The minimum temperature was practically normal.

The mean dew point was more than three degrees lower than usual and the relative humidity was more than three per cent higher owing to the large amount of wet weather.

The total precipitation was more than two inches above the normal, making it the wettest June since 1904.

Several heavy thunderstorms occurred during the first half of the month. There was about one hundred hours of cloudiness more than usual.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 331. JULY, 1916

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.06, 15th,	9 A
Minimum reduced to freezing, 29.22, 3d,	3 P
Reduced† maximum reading, 30.35, 15th,	9 A
Reduced† minimum reading, 29.51, 3d,	3 P
Mean semi-daily reduced	29.984
Monthly range	0.84

***Air Temperature.** In Degrees Fahr.

Highest	93 5, 31st, 2 P
Lowest	46.5, 1st, 4:30 A
Mean hourly	71.6
Mean of means of max. and min.	72.5
Mean sensible (wet bulb)	67.6
Monthly range	47 0
Highest mean daily	78.8, 12th
Lowest mean daily	61.4 4th
Mean maximum	82.9
Mean minimum	62.4
Mean daily range	20.5
Greatest daily range	39.5, 1st
Least daily range	7.5, 26th

Humidity.

Mean dew point	61.9
Mean force of vapor	0.780
Mean relative humidity	81.8

Precipitation. In inches.

Total precipitation	6.85
Number of days on which .01 inch or more rain fell	16

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	3126 m
Greatest daily movement	185m, 16th, 21st
Least daily movement	38m, 24th
Mean daily movement	101 m
Mean hourly velocity	4 2 m
Maximum pressure per square foot, 9.0 lbs = 42m per hour, 8th, 3 P, N.N.W.	
Maximum velocity for 5 minutes, 20m per hour, 31st, 8 P, N.	
Prevailing direction, South Southwest.	

Summary.

South Southwest	16 per cent
South	39 " "
Other directions	45 " "

Weather.

Mean cloudiness observed	57 per cent
Total cloudiness recorded by the Sun Thermometer	278 hours = 60 per cent
Number of clear days	1
Number of fair days	18
Number of cloudy days	12

Bright Sunshine.

Number hours recorded, 184 hrs, = 40 per cent

Rain, 2d, 3d, 4th, 8th, 9th, 10th, 13th, 17th, 20th, 21st, 22d, 23d, 25th, 26th, 27th, 28th, 31st.

Thunder and Lightning, 2d, 9th, 17th, 21st, 22d, 31st.

Gales, 35 or more miles per hour. 42m, 8th, N.N.W.; 36m, 27th, N.N.E.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.99	29.83	29 889	86.0	3:30 P	46.5	4:30 A	66.3	67.5	65 0	11.0
2	29.87	29.61	29.778	85.0	3:30 P	56.5	4 A	70.7	69 9	65.5	5.5
3	29.66	29.51	29.557	79.0	4 P	61.5	4:30 A	70.3	68 6	61.7	3.5
4	29.83	29 57	29.713	66.5	1:30 P	57.5	12 P	62.0	61.4	57.3	0.0
5	30.09	29.86	30.007	74 0	3:30 P	57.0	3 A	65.5	62.7	60.3	0.5
6	30.12	29 98	30.052	86 5	3:30 P	52.0	2 A	69.3	69.0	63.7	11.0
7	30.02	29 88	29.935	88.5	2:30 P	57.0	5 A	72.7	75.0	68.0	10.5
8	29.94	29.82	29.865	88.5	3 P	65.5	4:30 A	77.0	74.6	70.0	7.0
9	30.08	29.94	30.057	74.0	4 P	61.0	7 A	67 5	67 2	64.0	0.5
10	30.10	30 03	30.067	79 0	2 P	62.0	4 A	70.5	67.7	65 7	1.8
11	30.06	29.93	29 984	84 5	3:30 P	68.0	2 A	76.3	74.0	72.0	0.3
12	29.98	29.84	29.895	92.0	2 P	67.5	4:30 A	79.7	78.8	74.0	8.5
13	29.96	29 81	29.891	83.5	12 M	68.0	12 P	75.7	75.0	76.0	0 0
14	30.32	29.96	30.185	81 0	3:30 P	59.0	12 P	70.0	70.3	62.5	7.6
15	30 35	30.22	30.290	80.0	4 P	53 0	4:30 A	66.5	66.1	60.5	10.5
16	30.25	29.93	30.047	84.0	3 P	55 5	5 A	69.7	69.5	64.5	7.8
17	30.09	29 96	30.017	78.5	3 P	66.0	3 A	72.3	71.3	68.3	0.3
18	30.15	30.09	30 131	88 5	2 P	69.5	3:30 A	79.0	77.0	71.0	6.6
19	30.13	29 99	30.070	89 0	5 P	66.0	5 A	77.5	76.6	70.3	9.5
20	30.06	29.78	29.963	90 0	2 P	63.0	4:30 A	76.5	76.4	70.5	9.2
21	29.78	29.57	29.641	83.5	5 P	71.0	2 A	77.3	74.4	71.0	0.8
22	29 86	29.76	29.848	83.0	3 P	69.0	11 P	76.0	72.8	71.3	6.5
23	29.91	29.87	29.902	82.0	5:30 P	69 5	0 A	75.7	74.3	71.7	9 3
24	30.10	29.99	30 070	86.0	2:30 P	70 0	4 A	78 0	75.9	71.0	10.7
25	30.13	30.10	30.129	83.0	1 P	69.0	12 P	76.0	73.7	69.5	6.2
26	30.15	30.05	30 093	77.0	5 P	69.5	1 A	73.3	72.5	71.7	0.4
27	30.17	30.01	30.076	89 0	2 P	70.0	12 P	79.5	76.0	72.7	7.6
28	80.27	30.17	30.256	78.5	2:30 P	57.5	12 P	68.0	70.5	64.5	11.7
29	30.33	30.20	30.259	77.5	3 P	50.5	5:30 A	64.0	64.3	61.5	11.2
30	30.21	29 91	30.010	79.0	3 P	59.0	3 A	69.0	70.2	68.5	0.0
31	29.91	29.70	29.842	93.5	2 P	67.0	5:30 A	80.3	77.8	72.3	7.9

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	59 5	.829	62 5	N.W.	123	5.0	32	12 M				
2	61 5	.783	71.5	S.S.W.	139	3.5	26	7 P	9 P	12 P	.46	
3	58.5	.655	75.5	W.N.W.	118	0.5	10	4 P	0 A	4 A	.38	
4	53.5	.562	74.0	N.N.W.	153	1.5	17	1 P	7 P	12 P	.04	
5	57.5	.592	80.5	N.	124	1.0	14	12 M				
6	61.5	.707	78.5	N.	68	1.0	14	1 P				
7	64.5	.865	72.5	W.	98	0.5	10	2 P				
8	67.0	.865	79.0	W.N.W.	122	9.0	42	3 P	4 P	8 P	.34	
9	63 0	.636	91.0	E.N.E.	78	0.5	10	3 P	3 A	12 P	1.29	
10	65.0	.687	89.0	S.	60	1.0	14	4 P	0 A	6 A	.06	
11	71 0	.836	92.0	S.S.W.	140	1.0	14	2 P				
12	71.5	.986	80.0	S.W.	162	3.0	24	4 P				
13	69.5	.853	86.0	S.	97	0 5	10	10 A	1 P	7 P	.26	
14	59.5	.665	78.0	E.N.E.	77	0.0	—	—				
15	56 0	.675	75.0	S.S.W.	102	1.5	17	6 P				
16	61.5	.727	77.0	S.	185	2.0	20	1 P				
17	66.0	.770	84.5	S.	88	0.5	10	5 P	7 A	2 P	.45	
18	68.0	.893	78 0	S.	74	0.5	10	2 P				
19	67.5	.874	79.0	S.	94	1.0	14	4 P				
20	68.0	.865	81.5	S.	74	0.5	10	1 P	11 P	12 P	.06	
21	69 0	.861	83.0	N.N.E.	185	1.5	17	1 P	0 A	10 P	.81	
22	70.5	.794	94.0	S.	47	1.0	14	3 P	7 A	11 P	1.32	
23	70.0	.870	87.5	S.S.W.	63	1.0	14	1 P	7 P		T	
24	69.0	.857	83.0	S.	38	0.0	—	—				
25	68.5	.802	86.0	S.	57	1.0	14	6 P	5 P	12 P	.61	
26	71.5	.804	95.0	S.	123	1.5	17	2 P	8 A	12 P	.56	
27	72 0	.857	92.0	N N.W.	78	6.5	36	3 P	0 A	12 P	.16	
28	61.5	.746	72.5	N.N.E.	77	0.0	—	—	0 A	2 A	.03	
29	60.0	.597	87.0	S.S.W.	86	1.5	17	12 M				
30	67.5	.770	88.0	S.	112	0.0	—	—				
31	70.5	.909	82.0	W.	84	3.0	24	8 P	4 P	5 P	.02	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during July was marked by an unusually high humidity and large rainfall. The unusually large percentage of wind from the South caused many oppressive, sultry days and frequent rains, some with unusually large precipitation. The total rainfall was more than fifty per cent above the normal. The disagreeable character of the weather was prevalent during the whole month.

The records of the several weather elements show the following features of interest. The mean barometer was practically normal and the range of pressure slightly larger than usual. The total wind movement was considerably less than the normal, and there were no daily records of any considerable size. Only two gales were noted, and both were of moderate intensity and short duration. South or South Southwest wind was recorded more than one-half the days of the month, the remaining days being divided among most of the other directions.

The mean temperature was about one degree above the normal, while the maximum and minimum were near the usual values. The large amount of cloudiness should be considered with the temperature record in judging the general oppressiveness.

The mean dew point was practically normal, while the relative humidity was more than eight points above the normal, showing the highest humidity for July in ten years.

The total precipitation was two and one-half inches more than the normal, and was well distributed throughout the month.

Only one clear day was noted.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 332. AUGUST, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.97, 29th, 9 A
Minimum reduced to freezing,	29.23, 8th, 1 P
Reduced† maximum reading,	30.27, 29th, 9 A
Reduced† minimum reading,	29.51, 8th, 1 P
Mean semi-daily reduced	29.977
Monthly range	0.76

***Air Temperature.** In Degrees Fahr.

Highest	95.5, 22d, 3:30 P
Lowest	45.0, 29th, 2 A
Mean hourly	69.5
Mean of means of max. and min.	70.5
Mean sensible (wet bulb)	64.0
Monthly range	50.5
Highest mean daily	79.3, 22d
Lowest mean daily	57.7 28th
Mean maximum	82.6
Mean minimum	58.3
Mean daily range	24.3
Greatest daily range	35.0, 21st
Least daily range	9.5, 10th

Humidity.

Mean dew point	61.3
Mean force of vapor	.698
Mean relative humidity	80.7

Precipitation. In inches.

Total precipitation	2.49
Number of days on which .01 inch or more rain fell	8

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	3120 m
Greatest daily movement	242m, 3d
Least daily movement	41m, 21st
Mean daily movement	101 m
Mean hourly velocity	4.2 m

Maximum pressure per square foot, 20.5 lbs = 64m per hour, 23d, 5 P, S.S.W.

Maximum velocity for 5 minutes, 18m per hour, 14th, 3 P, W.

Prevailing direction, South Southwest.

Summary.

North	10 per cent
South Southwest	39 " "
East Southeast	13 " "
South	10 " "
Other directions	28 " "

Weather.

Mean cloudiness observed	54 per cent
Total cloudiness recorded by the Sun Thermometer	170 hours = 40 per cent
Number of clear days	10
Number of fair days	14
Number of cloudy days	7

Bright Sunshine.

Number hours recorded, 259 hrs, = 60 per cent

Rain. 8th, 9th, 11th, 12th, 13th, 23d, 26th, 27th, 28th.

Thunder and Lightning. 8th, 23d, 26th, 27th.

Gales. 35 or more miles per hour. 64m, 23d, S.S.W.; 40m, 27th, S.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.19	29 88	30.067	82.0	4 P	58.0	12 P	70.0	69.7	61.7	12.8
2	30.22	30.08	30.161	83.0	3:30 P	51.0	5:30 A	67.0	66 6	60 0	12.7
3	30.12	29.95	30.015	80.0	1:30 P	58.5	5 A	69.3	69.3	64.3	8.3
4	30.11	30.01	30.047	86 5	4:30 P	64.0	4 A	75.3	74.1	69.5	8.3
5	30.13	30.00	30.065	83.5	3 P	70.0	6 A	76.7	74.0	70.7	3.5
6	30.13	30 00	30.082	90 0	3 P	71.0	3 A	80.5	77 2	69.5	8.7
7	30.12	29 75	29.923	91.0	3:30 P	68.0	7 A	79.5	77.2	70.7	6.8
8	29.75	29 51	29 685	93 0	0:30 P	71.5	12 P	82.3	77.2	74.3	4.7
9	30.02	29.62	29.825	78.0	10:30 A	59.5	12 P	68.7	68.8	65 0	1.9
10	30.19	30.02	30.131	68.0	2 P	58.5	5 A	63.3	63.5	59.0	0.0
11	30.21	29.95	30.112	77.0	4 P	59.5	3 A	68.3	66 7	61.5	7.5
12	29 95	29.78	29 840	85.5	2 P	64.0	3 A	74 7	72.6	68.5	8.7
13	29.83	29.70	29.801	70.5	4 P	52.0	12 P	61.3	61.5	54.3	2.8
14	29.87	29.73	29 819	76.0	3 P	47.0	5 A	61.5	62.3	57 7	13 9
15	29.94	29.86	29.918	81.0	4:30 P	49.0	5:30 A	65.0	66.3	61.7	12.5
16	30.04	29.93	29.983	83.5	2:30 P	54 0	6 A	68.7	68.4	64 7	9.3
17	30.17	30 04	30.098	88 0	3:30 P	62.5	6 A	75 3	74.2	65.0	11.4
18	30.20	30.08	30.147	87 0	4:30 P	57.5	5 A	72.3	72.4	67.5	11.3
19	30.17	30.07	30 125	90.0	5 P	60.0	5:30 A	75.0	73.2	67.5	10.4
20	30.10	29.99	30.065	90.5	3:30 P	59.5	6 A	75.0	73 5	66.5	11.5
21	29.99	29.75	29.847	94.0	4:30 P	59 0	5:30 A	76.5	76.0	69.0	11.4
22	29.77	29.78	29 910	95 5	3:30 P	66 5	5:30 A	81.0	79.3	71.0	10.3
23	29 78	29.57	29 756	92.0	2:30 P	67.5	3:30 A	79.7	75.0	69.7	10.2
24	29.79	29 67	29.750	71.5	3 P	57 0	12 P	64 3	66 3	62.5	4.2
25	29 94	29.79	29 837	82 5	3 P	50 0	4 A	66.3	65.2	59.0	11.0
26	29.94	29.87	29 921	83 5	3 P	56.5	4:30 A	70.0	68.5	60.7	6.7
27	30.00	29 86	29.921	82.5	4 P	61.0	6 A	71.7	69.7	63 5	7.0
28	30.17	30.00	30.090	62.5	9 A	48.0	12 P	55 3	57.7	55 0	0.3
29	30.27	30.13	30.204	75.0	2:30 P	45 0	2 A	60.0	58.1	52.3	10.1
30	30.15	29.98	30 076	80.0	3 P	49.0	6:30 A	64.5	64.3	58.7	11.3
31	30.12	30 05	30.097	79.5	1:30 P	54 0	12 P	66.7	65.9	59.3	9.8

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	57.5	.690	69 5	N.	193	3.0	24	7 P				
2	56.0	.638	70.5	S.S.W.	117	2.0	20	6 P				
3	60.0	.734	73.0	S.S.W.	242	2.5	22	10 A				
4	68.0	.800	87.5	S.S.W.	118	0.0	—	—				
5	69 5	.816	89 5	S.S.W.	122	1.0	14	12 M				
6	68.0	.832	82·0	E.S.E.	108	0.0	—	—				
7	70.0	.819	90.5	S.	91	1.5	17	6 P				
8	72.5	.963	84.0	S.S.W.	125	2.5	22	12 M	3 P	12 P	.10	
9	62 5	.711	82.0	E.S.E.	92	1.0	14	12 M	0 A	4 A	.04	
10	56.0	.580	78.5	N.N.E.	151	0.5	10	8 P				
11	58.5	.638	78.5	E.S.E.	113	0.0	—	—	9 P	12 P	.14	
12	65 0	.797	88.0	W.	116	2.0	20	4 P	0 A	2 A	.06	
13	50 0	.504	73.5	N.W.	138	1.5	17	12 M	5 A	9 A	.08	
14	54 0	.578	74.0	W.N.W.	182	4.0	28	2 P				
15	58.0	.670	73.5	S.S.W.	83	1.0	14	2 P				
16	63 0	.687	85.0	S.W.	73	0.5	10	1 P				
17	61.0	.780	70.0	N.E.	68	0.0	—	—				
18	65 0	.763	81.5	S S.W.	42	0.0	—	—				
19	66.5	.744	88.5	S.S.W.	47	0.0	—	—				
20	64.0	.786	79 5	S.S.W.	44	0.0	—	—				
21	67.0	.863	78.0	S.S.W.	41	0.0	—	—				
22	68 0	.960	71.0	N.N.E.	57	0.0	—	—				
23	69.0	.780	91.0	S.	137	20 5	64	5 P	5 P	9 P	1.44	
24	60.5	.630	85 0	N.	68	0.0	—	—				
25	58.0	.537	90.5	W.	49	0.5	10	2 P				
26	56.5	.674	70.5	E.S.E.	73	2.0	20	4 P	8 A		T	
27	61.5	.656	84.0	S.	150	8.0	40	8 P	6 P	7 P	.21	
28	52.5	.489	81.0	N.	76	0.5	10	5 P	9 A	2 P	.42	
29	50.0	.436	86.0	S S.W.	50	0.0	—	—				
30	57.0	.545	86.5	S S.W.	86	0 0	—	—				
31	56.0	.565	79.5	S.W.	68	0.5	10	3 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during August, while generally seasonable, was more variable than usual. The first fourth of the month was a period of high temperature and high humidity. The second fourth was considerably cooler and pleasanter. The third quarter was the warmest period, although the relative humidity was less than during the first part of the month. The last quarter of the month was the nearest to normal conditions.

The total precipitation was much below the normal, in marked contrast with these records for the preceding two months. The thunder storm on the 23d was unusually severe in this locality, and considerable damage was done.

The following features of the several weather elements are shown on comparing with the normals for this station. The mean barometer was slightly below the normal and the range a little larger than usual. On more than one-half the days the maximum wind pressure was less than one pound and the daily wind movement small. Wind from the south points of the compass was much more frequent than usual.

The maximum temperature was nearly four degrees above the normal, and the highest record so far this year. The mean hourly temperature was nearly two degrees higher than usual. The minimum record was also rather high.

The mean dew point and relative humidity were both higher than the normals for these elements.

The total precipitation was about 60 per cent of the normal, and more than one-half of it occurred during the severe thunder storm mentioned above.

The total wind movement was practically normal and the amount of bright sunshine considerably more than the average value.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 333. SEPTEMBER, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.24, 11th, 10 A
Minimum reduced to freezing,	29.38, 8th, 2 P
Reduced† maximum reading,	30.53, 11th, 10 A
Reduced† minimum reading,	29.66, 8th, 2 P
Mean semi-daily reduced	30.036
Monthly range	0.87

***Air Temperature.** In Degrees Fahr.

Highest	89.5, 14th, 3 P
Lowest	36.5, 20th, 6 A
Mean hourly	60.8
Mean of means of max. and min.	61.3
Mean sensible (wet bulb)	55.5
Monthly range	53.0
Highest mean daily	74.9, 8th
Lowest mean daily	50.0, 30th
Mean maximum	73.9
Mean minimum	48.6
Mean daily range	25.3
Greatest daily range	41.5, 14th
Least daily range	6.0, 6th

Humidity.

Mean dew point	52.6
Mean force of vapor	.510
Mean relative humidity	81.3

Precipitation. In inches.

Total precipitation, in inches	5.08
Number of days on which .01 inch or more rain fell	8

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	3717 m
Greatest daily movement	320m, 29th
Least daily movement	35m, 14th
Mean daily movement	124 m
Mean hourly velocity	5.2 m
Maximum pressure per square foot,	9.5 lbs = 44m per hour, 29th, 2 P, S.
Maximum velocity for 5 minutes,	24m per hour, 29th, 2P, S.
Prevailing direction,	West Southwest.

Summary.

North Northwest	10 per cent
South Southwest	30 " "
West Southwest	10 " "
South	13 " "
Other directions	37 " "

Weather.

Mean cloudiness observed	45 per cent
Total cloudiness recorded by the Sun Thermometer	118 hours = 32 per cent
Number of clear days	16
Number of fair days	10
Number of cloudy days	4

Bright Sunshine.

Number hours recorded, 255 hrs, = 68 per cent

Rain, 5th, 6th, 7th, 8th, 15th, 18th, 19th, 23d, 28th, 29th.

Thunder and Lightning, 15th, 18th, 29th.

Frosts, 17th, 20th, 26th.

Gales, 35 or more miles per hour. 44m, 29th, S.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean, Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.12	29.86	30.007	86.0	3 P	47.5	6 A	66.7	67.7	64 7	8.4
2	30.13	29 81	29.934	75.0	1 P	47.0	12 P	61.0	66.3	65.0	8.5
3	30.30	30.13	30.280	68.5	5:30 P	37.5	5:30 A	53.0	53.5	46.5	12.0
4	30.30	30 03	30.158	76.0	3 P	47.0	5 A	61.5	61.6	54.5	10.8
5	30.16	30.01	30.096	67.0	3 P	57.5	5 A	62.3	60.6	55 7	0.2
6	30.16	30.04	30.106	59 0	12 P	53 0	6 A	56.0	56.0	55 0	0.0
7	30.04	29.81	29.936	83.5	4 P	58 0	5 A	70.7	69.7	66.7	7.1
8	29.81	29 66	29.743	86 5	2:30 P	70.5	6 A	78.5	74.9	70.7	7 2
9	30.15	29 74	29.985	74.5	3 P	60.0	5 A	67.3	64.3	53.3	11.5
10	30.38	30 15	30.329	76.5	2:30 P	44.5	6 A	60.5	59 7	50.5	12.0
11	30.53	30.38	30.459	75.0	3:30 P	42.0	6:30 A	58.5	57 5	51.3	11.5
12	30.42	30.16	30.302	77.5	4 P	41.0	5:30 A	59 3	58.5	51.5	11.0
13	30.16	29 96	30.078	84.0	3 P	55.0	6 A	69.5	64 7	57.3	11.5
14	30.04	29.90	29.977	89.5	3 P	48.0	5 A	68.7	68.2	63 5	10.3
15	29.91	29.77	29 816	74.0	9 A	62.5	12 P	68.3	68.2	67.7	0.4
16	30.14	29.80	30.036	68.5	2 P	44.0	12 P	56.3	58.8	52.3	10.3
17	30.26	30.10	30.184	67 0	3 P	37.0	7 A	52.0	52.7	47.3	11.5
18	30.10	29.95	30.066	73 0	3 P	41.5	5:30 A	57.3	56.0	50.5	7.8
19	30.12	29 99	30 094	63 0	3 P	41.0	12 P	52.0	52.6	45 3	11 0
20	30 15	30.01	30.116	73.0	3 P	36.5	6 A	54 7	55.2	49 7	10.5
21	30.06	29.95	29.981	74.5	3 P	43.0	6 A	58.7	59.2	52.0	10.5
22	29.97	29 92	29.957	75 0	2 P	56.0	0 A	65.5	63.5	59.7	7.0
23	29 94	29.73	29.850	71.0	4 P	54.0	12 P	62.5	62.5	60.5	0 6
24	29 86	29.79	29 841	65 0	3 P	47.0	5 A	56.0	56.0	55.5	9.3
25	29.88	29.76	29.847	64.0	4:30 P	45.0	12 P	54.5	52.6	46.0	8.6
26	29.99	29.88	29.963	71.0	4 P	37.5	5:30 A	54 3	54.0	47.3	12.1
27	30.04	29.93	30.015	83.5	3 P	55.5	0 A	69.5	67.0	59 3	8.3
28	30.05	29 94	29 999	79.0	2:30 P	59.0	6 A	69.0	68 4	63.3	10.0
29	29.95	29 68	29 830	77.0	12 M	52.0	12 P	64.5	65.5	60.3	5.0
30	30.25	29 79	30.085	59.0	2:30 P	39.0	12 P	49.0	50.0	42.7	10.1

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	63 0	.710	84 0	S.S.W.	87	1.5	17	8 P				
2	56.0	.601	78.0	W.N.W.	254	5.0	32	11 A				
3	41.0	.383	68.5	N.W.	74	2.0	20	9 A				
4	50.5	.509	74.5	S.S.W.	160	3.5	26	4 P				
5	53.5	.496	83.0	E.N.E.	107	0.0	—	—	1 P		T	
6	54.0	.456	91.5	N N.W.	38	0.0	—	—	0 A	9 A	.24	
7	65 5	.715	90.5	S.S W.	65	1.0	14	3 P	4 A	5 A	.01	
8	69 5	.780	92·0	W.	120	0.5	10	11 A	4 P	12 P	.04	
9	45 5	.545	56.0	N.N.E.	222	3.0	24	9 A				
10	44.5	.485	65 5	N.N.E.	108	1.0	14	12 M				
11	47.0	.427	78.5	S.S.E.	52	0.0	—	—				
12	49 5	.440	83.5	S.S.W.	100	1.0	14	3 P				
13	54 5	.531	81.0	S.S.W.	80	1 0	14	2 P				
14	63.0	.636	95.0	W.S.W.	35	0.0	—	—				
15	67.0	.704	95 0	S.	104	2.5	22	9 A	5 A	9 P	2.30	
16	49 0	.455	77.0	N.N.W.	139	1.5	17	12 M				
17	44 0	.365	78.5	S.W.	38	0.5	10	2 P				
18	48.5	.403	86.5	S.S.W.	66	1.0	14	3 P	3 P	12 P	.10	
19	41.0	.351	74.0	N.N W.	102	1.5	17	7 A	0 A	2 A	.01	
20	47.5	.400	84.0	S.S.W.	67	0.5	10	11 A				
21	50 5	.420	91.0	S.S.W.	136	3.5	26	1 P				
22	58 0	.515	88.0	S S.W.	149	2.0	20	2 P				
23	59 0	.557	92.0	S.	159	2.0	20	4 P	8 A	8 P	1.12	
24	54.0	.482	85.5	W S.W.	109	3.0	24	10 A				
25	47.5	.461	72.5	N.W.	111	2.5	26	11 A				
26	42 5	.378	74.0	W.S.W.	98	1.5	17	10 A				
27	56 0	.594	77.5	S.	128	1.5	17	2 P				
28	61.5	.636	87.0	S.	218	3.0	24	2 P	10 P		T	
29	59.0	.536	88 5	W.	320	9.5	44	2 P	1 P	11 P	1.26	
30	36.5	.327	67.0	N.	271	4.0	28	9 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during September was generally seasonable, and more pleasant than any of the summer months preceding it. More than one-half the days were clear and only four were recorded as cloudy. The large amount of sunshine aided the maturing of the fall crops and the absence of heavy frosts extended the growing season to the close of the month, giving corn ample time to mature. A few traces of frost were noted after the middle of the month but they were so light that no damage was done.

An analysis of the weather records for the month shows the following features: All the barometer records were nearly normal and changes in pressure were rather slow. Nearly one-half the time the wind was in the southwest quadrant. The total wind movement was about ten per cent more than the normal, although only one gale was registered on the pressure chart.

The maximum and minimum temperatures were both a few degrees above the normals for these records, while the mean hourly temperature was slightly below the normal for this station, The range of temperature on the 14th was unusually large.

The mean dew point was slightly below the normal and the relative humidity rather high.

The total precipitation was an inch more than usual. Nearly the whole amount fell during three heavy storms,—the one on tho 15th being the most severe.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 334. OCTOBER, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.22, 18th, 10 P
Minimum reduced to freezing,	29.21, 17th, 4 A
Reduced† maximum reading,	30.53, 18th, 10 P
Reduced† minimum reading,	29.50, 17th, 4 A
Mean semi-daily reduced	30.131
Monthly range	1.03

***Air Temperature.** In Degrees Fahr.

Highest	84.0, 8th, 3:30 P
Lowest	25.5, 18th, 6 A
Mean hourly	50.9
Mean of means of max. and min.	51.7
Mean sensible (wet bulb)	44.9
Monthly range	58 5
Highest mean daily	67.8, 20th
Lowest mean daily	39.6, 18th
Mean maximum	65.2
Mean minimum	38.1
Mean daily range	27.1
Greatest daily range	43.0, 8th
Least daily range	9.5, 20th

Humidity.

Mean dew point	41.3
Mean force of vapor	.360
Mean relative humidity	78.4

Precipitation. In inches.

Total precipitation, in inches	1.01
Number of days on which .01 inch or more rain fell	3

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	4176 m
Greatest daily movement	422m, 17th
Least daily movement	3m, 3d
Mean daily movement	135 m
Mean hourly velocity	5.6 m

Maximum pressure per square foot, 20.01lbs = 63m per hour, 17th, 11A, W.N.W.

Maximum velocity for 5 minutes, 42m per hour, 17th, 2P, W.N.W.

Prevailing direction, West Northwest.

Summary.

North Northwest	13 per cent
West	16 " "
West Southwest	10 " "
South Southwest	10 " "
Northwest	13 " "
North	16 " "
Other directions	22 " "

Weather.

Mean cloudiness observed	43 per cent
Total cloudiness recorded by the Sun Thermometer	113 hours = 33 per cent
Number of clear days	14
Number of fair days	11
Number of cloudy days	6

Bright Sunshine.

Number hours recorded, 228 hrs, = 67 per cent

Rain, 9th, 13th, 19th, 20th, 21st, 25th, 29th, 31st.

Frosts, 2d, 3d, 12th, 18th, 23d, 24th, 27th.

Gales, 35 or more miles per hour. 41m, 13th, S.W.; 39m, 14th, N.W.; 63m, 17th, W.N.W.; 36m, 19th, E.S.E.; 46m, 20th, S.; 38m, 26th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean, Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.39	30.25	30.390	65.5	3:30 P	34.5	6 A	50.0	47.6	42.7	10.2
2	30.45	30 27	30.388	69.5	4 P	34.0	6:30 A	51.7	49.1	43.0	10.7
3	30.29	30.20	30.279	74.5	3:30 P	35.0	6:30 A	54.7	52.6	47.5	9.7
4	30.36	30.25	30 352	71.0	3:30 P	45.0	0 A	58.0	54.5	50.3	7.8
5	30.39	30.15	30.295	80.0	3 P	42.0	3:30 A	61.0	58.0	51.3	8.2
6	30.15	29 94	30.065	79.5	2 P	55.5	5:30 A	67.5	64.6	59.3	6.0
7	30.19	30.06	30.167	75.0	4 P	47.0	6:30 A	61.0	57.0	51.0	10.0
8	30.11	29 84	30 004	84.0	3:30 P	41.0	6 A	62.5	60.8	54 3	8.7
9	30.00	29 66	29.851	77.0	2 P	43.0	12 P	60.0	62.7	55.0	3.5
10	30.23	30.00	30.196	53.0	2 P	34.5	6:30 A	43.7	46.5	36.5	10.5
11	30.18	30.11	30.147	58.0	3:30 P	37 0	1 A	47 5	45.9	42.3	5.3
12	30.32	30.18	30.279	67.0	3 P	31.0	6 A	49.0	47 7	40.3	9.5
13	30.18	29 63	29.845	63.0	10:30 A	43.0	1:30 A	53.0	53.8	51.7	1.8
14	30.13	29.73	30.057	54.0	3 P	33 0	12 P	43.5	43 3	36.7	9 6
15	30.13	29 81	29 990	62.5	2 P	32 5	6:30 A	47.5	48.1	37.0	7.9
16	29.81	29 64	29.782	65.0	3 P	49.0	7 A	57.0	55.9	50.0	5 3
17	30.24	29.50	29 847	62.0	6 A	33.5	12 P	47.7	50.0	45.0	7.2
18	30.53	30 24	30.486	56.0	2:30 P	25.5	6 A	40.7	39.6	35.7	9.5
19	30.51	29.76	30.121	65.0	12 P	33.5	3 A	49 3	46.5	39.0	0.0
20	29.80	29.61	29 723	74.5	2:30 P	65.0	6 A	69.7	67.8	66.0	3.8
21	29.91	29.62	29.770	69.0	2 P	42.0	12 P	55.5	60.4	50.3	7 1
22	30.37	29.91	30.205	56 5	2:30 P	33.0	7 A	44.7	43.8	37.3	9.3
23	30.52	30.37	30.459	58.0	3:30 P	30 0	7 A	44.0	42.9	35.5	9.0
24	30.37	30.25	30 307	56.5	4 P	28.0	7 A	42 3	42.0	35.7	8.8
25	30.27	29.84	30.109	62.5	1:30 P	31.0	6 A	46.7	47 4	41.5	8.5
26	30.12	29.75	29.967	56.0	2 P	35.5	12 P	45.7	49.8	40.5	9.3
27	30.19	30 04	30.134	56.5	3 P	26.5	7 A	41.5	41.0	34 0	8.8
28	30.37	30.10	30.327	62.5	3:30 P	34 5	4 A	48 5	45.9	42.5	9.8
29	30.44	30.24	30.392	60.5	1:30 P	32.0	5:30 A	46.3	46.2	41.5	7.2
30	30.24	30 05	30.152	65.0	3 P	47.5	4:30 A	56.3	54.7	52.3	3.3
31	30.05	29.91	29 985	62.5	2:30 P	46.5	3 A	51.5	51.5	48.7	2.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	36.0	.318	69.5	N.	185	3.0	24	9 A				
2	41.5	.299	86.5	N.	37	0.0	—	—				
3	45 5	.364	85.0	N.	3	0.0	—	—				
4	48.0	.401	85.0	N.	6	0.0	—	—				
5	49.0	.428	86.0	W.	47	0.5	10	7 P				
6	58.5	.525	93.0	W.	123	1.0	14	3 P				
7	48 5	.406	86.0	N N.W.	23	0.5	10	11 A				
8	52.0	.492	84.0	W.S.W.	58	0.5	10	3 P				
9	51.5	.509	78.5	N.W.	198	5.0	32	9 P	12 M		T	
10	31 5	.243	73.5	N.N.W.	267	5.5	33	3 A				
11	39.5	.298	80.0	W.	107	1.0	14	2 P				
12	36.0	.550	73.0	S.S.W.	48	0.0	—	—				
13	49.5	.420	85 0	S.S.W.	307	8.5	41	5 P	2 P	7 P	.07	
14	31.0	.253	68.5	N.N W.	305	7.5	39	2 A				
15	29.5	.265	64.0	W.S.W.	193	3.0	24	6 P				
16	47.0	.409	78.0	W.	178	2.5	22	11 P				
17	39.0	.374	68.0	W.N.W.	422	20.0	63	11 A				
18	33.5	.235	81.5	E.N.E.	28	0.5	10	8 P				
19	42.0	.308	90.5	N.E.	79	6.5	36	2 P	8 A	11 P	.92	
20	65.5	.656	95.0	S.S.W.	339	10.5	46	12 P	5 P		T	
21	46.5	.420	78.0	N.W.	353	5.0	32	1 A	6 A	8 A	.02	
22	30.0	.263	64.0	N.W.	112	2.0	20	3 P				
23	30 5	.240	71.5	N.	58	0 0	—	—				
24	32.0	.237	77.0	E.N.E.	18	0.0	—	—				
25	37.0	.313	74.5	S.W.	120	4.5	30	6 P	9 P		T	
26	31.0	.321	56.5	N.W.	274	7.0	38	12 M				
27	27.5	.233	66.5	W.	70	1.0	14	8 P				
28	37.0	.316	72.0	N.N.W.	84	0.5	10	1 P				
29	37.5	.302	79.0	W.S.W.	73	0.0	—	—	10 P		T	
30	51.0	.411	92 0	S.	43	0.0	—	—				
31	47.0	.364	90.0	S.	18	0.0	—	—	9 P	12 P	T	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

During the month ideal autumn weather was in evidenee almost the whole time. With only three days showing a measurable amount of rainfall and nearly one-half the days recorded as clear, and more than one-third of the days fair, there was but little room left for improvement. The large amount of sunshine, mild temperature and rather low humidity, combined to make weather conditions most agreeable,

The various weather elements show a number of features of interest when their records are compared with the normals at this station.

The mean barometer was considerably higher than the normal, and the range of pressure slightly smaller than usual. While the maximum and minimum records were both nearly normal, the interval between the two records was unusually short. The total wind movement was a little more than usual, and several gales of moderate intensity were registered on the pressure chart. The wind direction was more nearly normal than during the last few months.

The maximum temperature was five degrees higher than the normal and the minimum about two degrees higher, giving a slightly greater range than usual. The mean temperature was slightly above the normal.

The mean dew point and relative humidity were both nearly normal.

The total precipitation was practically one inch, making it the dryest month so far this year. Owing, however, to the large precipitation which occurred during the summer, the absence of much rain was not particularly felt.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 335. NOVEMBER, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.23, 7th, 8 A
Minimum reduced to freezing,	28.72, 23d, 12 P
Reduced† maximum reading,	30.55, 7th, 8 A
Reduced† minimum reading,	29.02, 23d, 12 P
Mean semi-daily reduced	30.101
Monthly range	1.53

***Air Temperature.** In Degrees Fahr.

Highest	64.0, 9th, 4 P
Lowest	12.5, 22d, 7 A
Mean hourly	37.4
Mean of means of max. and min.	38.1
Mean sensible (wet bulb)	33.9
Monthly range	51 5
Highest mean daily	52.8, 9th
Lowest mean daily	22.9, 27th
Mean maximum	48.0
Mean minimum	28.1
Mean daily range	19.9
Greatest daily range	34.5, 22d
Least daily range	7.5, 12th

Humidity.

Mean dew point	30.5
Mean force of vapor	.222
Mean relative humidity	82.3

Precipitation. In inches.

Total precipitation, in inches	3.29
Total snow, in inches	1½
Number of days on which .01 inch or more rain fell	10

* Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	3929 m
Greatest daily movement	382m, 24th
Least daily movement	1m, 17th
Mean daily movement	131 m
Mean hourly velocity	5.5 m

Maximum pressure per square foot, 22.5 lbs = 67m per hour, 23d, 8 P, S.S.W.

Maximum velocity for 5 minutes, 40m per hour, 23d, 9P, S.S.W.

Prevailing direction, West.

Summary.

West Southwest	10 per cent
West	23 " "
West Northwest	17 " "
South	13 " "
North	10 " "
Other directions	27 " "

Weather.

Mean cloudiness observed	51 per cent
Total cloudiness recorded by the Sun Thermometer	152 hours = 52 per cent
Number of clear days	5
Number of fair days	13
Number of cloudy days	12

Bright Sunshine.

Number hours recorded, 141 hrs, = 48 per cent

Rain, 4th, 5th, 9th, 13th, 14th, 23d, 29th, 30th.

Snow, 15th, 16th, 17th.

Gales, 35 or more miles per hour. 38m, 9th, S.S W.; 36m, 11th, W.N.W.; 36m, 16th, N.W.; 67m,23d,S.S.W.; 39m,24th, W.; 41m, 25th, W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.98	29 82	29.903	60.0	2:30 P	43.0	12 P	51.5	50.8	47.3	3.0
2	30 03	29.98	30 025	59.5	3 P	37.0	7 A	48.3	46.7	37.5	8.3
3	30.17	29 96	30.094	51.0	1 P	32 0	6 A	41.5	41.6	39 0	7.7
4	30.19	30.11	30.158	55.0	3 P	31.0	7 A	43.0	42.4	41.0	8.3
5	30.43	30.11	30.292	49.0	0 A	35.5	7 P	42.3	37 4	37.3	0.0
6	30.51	30 43	30 489	52.5	4 P	30.5	8:30 A	41.5	38.2	31.0	9.0
7	30.55	30 40	30 496	56 5	3 P	24.0	7:30 A	40.3	38.1	32.7	7.3
8	30.40	30.08	30 234	61.0	3 P	34.0	6 A	47.5	45.6	40 7	7.0
9	30.08	29 60	29.804	64.0	4 P	41.5	7 A	52.7	52.8	48.7	7.0
10	29.91	29.72	29 957	55 5	12 M	36 0	12 P	45.7	46.4	38.3	7.5
11	30.46	29 91	30.310	50 5	2 P	29.0	12 P	39.7	40.9	36.5	9.5
12	30.54	30 24	30 433	35.0	12 P	27.5	7:30 A	31.3	31.9	30.3	0.0
13	30.24	29 72	30.058	42.5	3 P	34.0	3 A	38.3	37.4	36.0	0 0
14	30.14	29.70	29 912	40.0	0 A	22.0	12 P	31.0	32.6	30.5	0.5
15	30.16	30 04	30.108	38.5	3 P	21 0	5 A	29 7	27.3	23.7	6.9
16	30.23	30.03	30.157	35 5	1 P	20.5	7 A	28.0	27.6	23.7	7.0
17	30 23	29 92	30.109	28 0	3 P	17.0	3 A	22 5	23.9	23.7	0 0
18	29 95	29 86	29 926	41.0	2 P	23.5	5:30 A	32.3	31.3	29.0	5.5
19	29 86	29.75	29.767	49.5	3 P	27.0	12 P	38 3	36.0	31.3	7.5
20	30.13	29.77	29 927	46.0	1 P	26 0	12 P	36.0	34.9	32.3	2.3
21	30.41	30.13	30.356	37.5	3:30 P	18.0	12 P	27 7	26.2	22.3	8 5
22	30.40	30 03	30.188	47 0	3 P	12 5	7 A	29.7	28.2	23 3	7 1
23	30.03	29.02	29 670	57.5	12 P	23 5	6 A	40.5	36.0	40.5	0 0
24	29.75	29 02	29 527	57 5	0 A	33 0	12 P	45.3	44.6	40.3	0.8
25	30.21	29.75	30 085	33 0	0 A	19 0	10 P	26.0	27.0	24 5	6.0
26	30.48	30 21	30.438	29.0	3:30 P	19.5	10 P	24.3	22.9	19.0	6 9
27	30.46	30.21	30.332	51.0	2 P	20 0	0 A	35.5	36.5	30 5	6.2
28	30.32	30.15	30.263	47.5	3:30 P	29 5	7:30 A	38.5	39.9	34.3	1.7
29	30.25	30.00	30.174	56.5	1:30 P	38 0	1 A	47.3	47 9	46.0	0.0
30	30.00	29 77	29.835	54.0	5 A	39.0	12 P	46.5	48.1	48.3	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	46.0	.336	94.5	W.	116	3 0	24	3 P				
2	32 0	.260	70.5	W.	181	3.5	26	11 A				
3	36 5	.255	84 0	N.W.	182	5.0	32	2 P				
4	40.0	.265	92.0	N.	87	1.0	14	11 P	10 P	12 P	.13	
5	35 5	.230	91.5	N.E.	116	0.5	10	3 P	6 A	1 P	.37	
6	27.5	.186	82.5	N.	92	0.0	—	—				
7	28 5	.213	78.5	E.	36	0.0	—	—				
8	39 5	.272	94 0	S.	113	1.5	17	9 P				
9	46.5	.386	84.0	S.S.W.	151	7.0	38	9 P	10 P	11 P	.07	
10	33.0	.261	74.5	W.N.W.	229	3.0	24	11 A				
11	31.5	.257	73.5	W.N.W.	233	6.5	36	10 A				
12	28.0	.181	82.5	N.W.	10	0 0	—	—				
13	34.0	.222	88 5	W N.W.	40	0.0	—	—	8 P	12 P	.13	
14	29 0	.177	92 0	N.N.W.	134	2.5	22	3 P	0 A	10 A	.20	
15	20.0	.136	81.5	N.N.E.	107	0.5	10	11 A	11 P	12 P	T	T
16	21.0	.135	84 5	W.N.W.	157	6 5	36	12 M	0 A	3 A	.02	$\frac{1}{4}$
17	21.5	.134	87.5	W.	1	2.0	20	10 P	7 A	12 P	.05	$1\frac{1}{4}$
18	26 0	.169	84.5	W.	35	1.0	14	2 P				
19	27.5	.189	80.5	S.W.	47	1.0	14	12 M				
20	28.5	.200	81.0	W.N.W.	38	5.0	32	10 P				
21	17.0	.131	75.0	N.	192	3.5	26	7 A				
22	18 5	.147	77.0	W.	25	0.0	—	—				
23	38 0	.300	89.5	S.	43	22.5	67	8 P	10 A	10 P	1.34	
24	37 5	.276	83.0	W.	382	7.5	39	1 P				
25	21.5	.145	79.5	W.	364	8.5	41	10 A				
26	10.5	.116	66.0	W.S.W.	210	5.0	32	11 A				
27	23.5	.198	64.5	W.S.W.	225	3.0	24	5 A				
28	28 0	.228	69.5	S.	160	1.5	17	3 P				
29	45 5	.326	96 5	S.	83	4.5	30	12 P	6 P	12 P	09	
30	44.0	.340	87.5	W.S.W.	140	5.0	32	6 A	0 A	3 P	.89	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather conditions during November were generally seasonable, and features of unusual interest were but few. A small amount of snow occurred about the middle of the month, which was rather early, and ice of some little thickness was formed about a week later. More than two-thirds of the total precipitation occurred during the last third of the month.

An examination in detail of the records of the several weather elements shows the following features of more or less interest: The mean dew point was rather high, while the maximum was practically normal. The minimum pressure was recorded at midnight of the 23d, following the heaviest rainstorm of the month, which occurred while the barometer was falling rapidly. The recovery of pressure the next day was almost as rapid as the fall had been. The total wind movement was more than ten per cent less than the normal, and the largest daily movements were from the West.

Both the maximum and minimum temperatures were nearly normal, while the mean for the month was about one degree lower than usual. The greatest daily range was on the date of lowest temperature.

The mean dew point was normal, while the relative humidity was more than six points higher than usual.

The total precipitation was slightly more than the normal, and more than three times the amount of the preceding month. The snowfall was more than usual so early in the season.

The amount of cloudiness recorded and the amount obtained by estimation at the 8 A M and 8 P. M. observations were unusually concordant. The percentage of sunshine was slightly more than the average.

J. E. OSTRANDER, Meteorologist.

J. S. SIMS, Observer.

BULLETIN No. 336. DECEMBER, 1916

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.15, 26th, 3 P
Minimum reduced to freezing,	28.65, 22d, 2 P
Reduced† maximum reading,	30.47, 26th, 3 P
Reduced† minimum reading,	28.96, 22d, 2 P
Mean semi-daily reduced	29.932
Monthly range	1.51

***Air Temperature.** In Degrees Fahr.

Highest	54.5, 5th, 3 P
Lowest	0.0, 31st, 6 A
Mean hourly	26.5
Mean of means of max. and min.	26.5
Mean sensible (wet bulb)	24.0
Monthly range	54.5
Highest mean daily	47.5, 5th
Lowest mean daily	10.4, 30th
Mean maximum	33.7
Mean minimum	19.5
Mean daily range	14.2
Greatest daily range	24.5, 18th
Least daily range	3.0, 23d

Humidity.

Mean dew point	20.3
Mean force of vapor	.149
Mean relative humidity	81.7

Precipitation. In inches.

Total precipitation, in inches	2.85
Total snow, in inches	9½
Number of days on which .01 inch or more rain fell	10
Days of Sleighing	20

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	4026 m
Greatest daily movement	387m, 23d
Least daily movement	0m, 4th
Mean daily movement	130 m
Mean hourly velocity	5.4 m

Maximum pressure per square foot, 15.5 lbs = 56m per hour, 22d, 12 P, W.N.W.

Maximum velocity for 5 minutes 32m per hour, 22d, 9P, W N.W.

Prevailing direction, West Northwest.

Summary.

North Northwest	16 per cent
West	13 " "
North	10 " "
Northwest	19 " "
West Northwest	23 " "
Other directions	19 " "

Weather.

Mean cloudiness observed	53 per cent
Total cloudiness recorded by the Sun Thermometer	156 hours = 55 per cent
Number of clear days	6
Number of fair days	11
Number of cloudy days	14

Bright Sunshine.

Number hours recorded, 127 hrs, = 45 per cent

Rain, 4th, 5th, 9th, 22d, 27th, 28th.

Snow, 11th, 12th, 15th, 21st, 25th, 28th.

Hail, 27th, 28th.

Gales, 35 or more miles per hour. 45m, 6th, N.N W.; 35m, 12th, W.N.W.; 39m, 13th, W.N.W.; 43m, 16th, N.W.: 56m, 22d, W.N.W.; 45m, 25th, W.N. W.: 37m, 28th, W.N.W.; 35m, 29th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.85	29.60	29.769	41.5	2 P	33.5	7 A	37.5	36.0	32.3	5.3
2	29.99	29.59	29.837	42.0	0:30 P	30.0	1 A	36.0	36.4	35.3	2.0
3	30.26	29.99	30.207	44.0	2 P	31.0	12 P	37.5	36.1	32.3	6.9
4	30.26	29.92	30.144	44.5	2 P	37.0	11 P	40.7	38.0	37.0	0.0
5	29.92	29.56	29.669	54.5	3 P	38.0	0 A	46.3	47.5	46.5	0.2
6	29.74	29.60	29.646	47.0	0 A	36.0	3 P	41.5	39.4	37.3	1.7
7	30.03	29.74	29.964	43.0	3:30 P	31.0	12 P	37.0	36.8	32.7	7.7
8	30.10	30.03	30.078	50.5	4 P	26.5	6 A	38.5	33.9	28.7	7.6
9	30.06	29.86	29.953	38.5	3 P	27.0	4:30 A	32.7	33.0	34.7	0.0
10	30.16	29.94	30.099	37.0	1 P	28.0	7:30 A	32.5	31.5	29.5	4.0
11	30.16	29.67	29.977	37.5	1:30 P	22.5	5:30 A	30.0	30.1	26.5	0.2
12	29.67	29.11	29.380	34.0	9 P	25.0	2 P	29.5	31.7	31.7	0.0
13	29.86	29.47	29.787	31.0	1 P	14.0	12 P	22.5	23.8	19.7	7.0
14	30.12	29.86	30.106	30.0	2:30 P	7.5	6:30 A	18.5	19.1	15.3	7.0
15	30.03	29.22	29.798	19.0	4 P	14.5	4:30 A	16.7	17.4	17.0	0.0
16	29.60	29.20	29.360	23.0	3 P	11.0	12 P	17.0	18.3	17.0	7.2
17	29.84	29.60	29.738	25.5	2 P	8.0	12 P	16.7	16.5	13.7	7.0
18	29.91	29.61	29.823	28.0	1:30 P	3.5	6 A	15.7	15.5	11.7	6.8
19	29.90	29.60	29.702	27.5	0:30 P	14.5	11 P	21.0	19.8	19.0	2.2
20	30.08	29.90	30.091	18.5	2:30 P	4.0	7:30 A	11.3	16.5	11.7	4.8
21	30.06	29.98	30.033	29.0	12 P	14.0	0 A	21.5	23.7	22.7	0.0
22	29.98	28.96	29.437	38.0	12 M	24.5	12 P	31.3	31.3	29.0	0.0
23	29.99	29.47	29.905	28.0	3 P	25.0	8 A	26.5	25.7	24.0	7.1
24	30.10	29.86	30.060	30.5	3 P	21.5	5:30 A	26.0	26.0	23.3	7.3
25	30.25	29.41	29.830	34.5	12 M	19.0	12 P	26.7	24.3	19.3	3.0
26	30.47	30.42	30.452	27.0	2:30 P	6.5	8 A	16.7	16.6	10.5	8.2
27	30.44	30.02	30.303	33.0	12 P	17.0	0 A	25.0	23.2	24.0	0.0
28	30.01	29.83	29.936	38.5	2 P	25.0	12 P	31.7	31.9	29.3	1.2
29	30.29	30.01	30.241	25.0	0 A	8.0	12 P	16.5	19.5	16.0	8.6
30	30.32	30.21	30.271	21.0	2:30 P	1.0	6 A	11.0	10.4	6.7	6.6
31	30.37	30.17	30.299	23.0	2 P	0.0	6 A	11.5	12.7	10.5	7.1

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement In Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	28 5	.196	81.0	N.W.	166	3.5	26	12 M				
2	31.5	.224	78.5	W.	137	3.0	24	12 M				
3	28.5	.197	81.5	W.N.W.	8	0.5	10	1 P				
4	33.5	.226	85.0	S.S.W.	0	0.0	—	—	7 P	12 P	T	
5	43.5	.350	81.5	S.S.W.	98	3.0	24	12 M	0 A	8 A	.05	
6	34.0	.239	81.5	W.N.W	276	10.0	45	5 P				
7	27.5	.206	74.5	N.W.	362	5.0	32	1 P				
8	23.5	.175	74.5	N.N.W.	47	1.0	14	7 A				
9	33.5	.204	95.5	N.	3	2.5	22	12 P	2 P	9 P	.25	
10	26.5	.172	87.0	N.W.	229	5.0	32	5 A				
11	22.5	.153	83.0	W.S.W.	57	3 0	24	7 P	4 P	12 P	.03	$\frac{1}{2}$
12	30.0	.183	92.5	W.N.W.	51	6.0	35	12 P	0 A	9 P	1.03	$3\frac{1}{4}$
13	14 5	.119	74.5	W.N.W.	244	7.5	39	7 A				
14	10.0	.098	72.5	W.	54	2.5	22	3 P				
15	15.0	.098	91.0	N.W.	68	2.0	20	10 P	7 A	10 P	.42	$4\frac{3}{4}$
16	13.0	.103	79.0	W.N.W.	327	9.0	43	1 P				
17	10.0	.088	80.0	W.N.W.	116	2.0	20	3 P				
18	8.0	.082	79.0	N.N.W.	23	1.5	17	9 A				
19	16.5	.109	88 0	N.N.W.	147	4.0	28	9 A				
20	6 5	.083	74.5	W.	16	0.0	—	—				
21	20.0	.129	84.5	E.	24	0.5	10	4 P	6 A	9 A	.04	$\frac{3}{4}$
22	26.0	.167	89.0	N.N.W.	164	15.5	56	12 P	5 A	5 P	.86	
23	17 5	.141	71.0	W.	387	5.5	33	10 A				
24	20.0	.133	84.0	N.W.	78	1.0	14	4 A				
25	13.0	.117	70.0	W.N.W.	151	10.0	45	2 P	0 A	2 A	.02	$\frac{1}{4}$
26	6.0	.078	78.0	N.N.W.	161	3.5	26	10 P				
27	22.5	.136	90.5	N.N.E.	90	1.5	17	0 A	7 A	12 P	.09	
28	26.5	.169	89.0	S.W.	154	7.0	37	6 P	0 A	1 P	.06	T
29	10.5	.100	75.5	N.W.	260	6.0	35	1 A				
30	3.0	.066	80.0	N.	63	2.0	20	1 P				
31	7.0	.077	86.0	N.	65	2.5	22	11 A				

**Rain or melted snow at base of tower. *Included in following day.

Annual Summary for 1916.

Pressure. In inches.

Maximum reduced to freezing, ... 30.31, Jan. 8th, 9 A.; Jan. 29th, 10 A.
Minimum reduced to freezing, ... 28.45, Feb. 25th, 12 P.
Maximum reduced to freezing and sea-level, ... 30.64, Jan. 8th, 9 A.
Minimum reduced to freezing and sea-level, ... 28.76, Feb. 25th, 12 P.
Mean reduced to freezing and sea-level, ... 30.006
Annual range, ... 1.88

***Air Temperature.** In degrees Fahr.

Highest, ... 95.5, Aug. 22d, 3:30P.
Lowest, ... —16.0, Feb. 15th, 9A.
Mean hourly, ... 46.0
Mean of means of max. and min., ... 46.4
Mean sensible (wet bulb), ... 42.2
Annual range, ... 111.5
Highest mean daily, ... 79.3, Aug. 22
Lowest mean daily, ... 1.3, Feb. 15
Mean maximum, ... 56.6
Mean minimum, ... 36.2
Mean daily range, ... 20.4
Greatest daily range, ... 43.5, Mar. 26
Least daily range, ... 3.0, Dec. 23

Humidity.

Mean dew point, ... 38.4
Mean force of vapor, ...370
Mean relative humidity, ... 80.3

Wind.

Prevailing direction, ... West.

Summary.

Northwest, ... 9 per cent
South Southwest . . . . . 14 " "
West, ... 14 " "
South . . . . . 11 " "
West Northwest . . . . . 10 " "
North . . . . . 9 " "
Other directions, ... 33 " "
Total movement, ... 52,450 m
Greatest daily movement, ... 519m., Feb. 28
Least daily movement, ... 0 m., Dec. 4
Mean daily movement, ... 143 m
Mean hourly velocity, ... 6.0 m
Maximum pressure per square foot, 25.0 lbs.=71 m. per hour, Jan 23, 1 A., W.
Maximum velocity for 5 minutes, 48 m. per hour, Apr. 15th, 10 A., N.

Precipitation. In inches.

Total precipitation, rain or melted snow, . 45.61
Number of days on which .01 or more rain or melted snow fell, ... 126
Snow total in inches, ... 59.5

Weather.

Mean cloudiness observed, ... 53 per cent.
Total cloudiness recorded by Sun Thermometer, ... 2418 hrs.=53 per cent.
Number of clear days, ... 121
Number of fair days, ... 129
Number of cloudy days, ... 136

Bright Sunshine.

Number of hours recorded, 2036 hrs.=47 per cent.

Dates of Frosts.

Last, ... May 19th
First, ... Sept. 17th

Dates of Snow.

Last, ... April 14th
First, ... Nov. 15th
Total days of sleighing, ... 99

Gales of 50 or More Miles Per Hour.

Jan. 22d, 59m., W.; Jan. 23d, 71m., W.: Feb. 7th, 54m, W.N.W.; Feb 19th, 51m., W.; Feb. 28th, 57m., W N.W.: April 15th, 61m, N.; May 11th, 61 m, W.; May 12th, 62m, W.N.W.; Aug. 23d, 64m., S.S.W.; Oct. 17th 63m, W.N.W.; Nov. 23d, 67m, S.S.W.; Dec. 22d, 56m., W.N.W.

*Temperature in ground shelter.

J. S. SIMS,
Observer.

J. E. OSTRANDER,
Meteorologist.

BULLETIN No. 337. JANUARY, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.42, 15th, 10 A
Minimum reduced to freezing,	29.05, 10th, 5 P
Reduced† maximum reading,	30.74, 15th, 10 A
Reduced† minimum reading,	29.36, 10th, 5 P
Mean semi-daily reduced	30.007
Monthly range	1.38

***Air Temperature.** In Degrees Fahr.

Highest	47.5, 14th, 8:30 A
Lowest	−3.5, 27th, 6 A
Mean hourly	23.1
Mean of means of max. and min.	23.5
Mean sensible (wet bulb)	21.3
Monthly range	51.0
Highest mean daily	36.4, 9th
Lowest mean daily	5.4, 12th
Mean maximum	31.7
Mean minimum	15.3
Mean daily range	16.4
Greatest daily range	32.5, 27th
Least daily range	3.0, 5th

Humidity.

Mean dew point	17.6
Mean force of vapor	.133
Mean relative humidity	82.4

Precipitation. In inches.

Total precipitation, in inches	3.64
Total snow, in inches	15
Number of days on which .01 inch or more rain fell	9
Days of Sleighing	25

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	4701 m
Greatest daily movement	391m, 19th
Least daily movement	7m, 14th
Mean daily movement	152 m
Mean hourly velocity	6.3 m

Maximum pressure per square foot, 16.0 lbs = 57m per hour, 14th, 9 A, S.S.W.

Maximum velocity for 5 minutes 36m per hour, 14th, 9A, S.S.W.

Prevailing direction, West.

Summary.

North Northwest	10 per cent
West	10 " "
West Southwest	10 " "
Northwest	19 " "
West Northwest	16 " "
Southwest	13 " "
Other directions	22 " "

Weather.

Mean cloudiness observed	64 per cent
Total cloudiness recorded by the Sun Thermometer	163 hours = 55 per cent
Number of clear days	9
Number of fair days	6
Number of cloudy days	16

Bright Sunshine.

Number hours recorded, 131 hrs, = 45 per cent

Rain, 5th, 14th, 31st.

Snow, 3d, 13th, 18th, 21st, 22d, 25th, 26th, 27th, 28th, 29th, 31st.

Hail, 13th.

Gales, 35 or more miles per hour. 36m, 6th, N.N.W.; 45m, 7th, N.W.; 35m, 11th, N.; 35m, 12th, N.N.W.; 57m, 14th, S.S.W.; 35m, 17th, W.N.W.; 41m, 19th, N.W.; 46m, 22d, N.W.; 37m, 25th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.17	29 72	29.865	31.0	6 P	16.0	5 A	23.5	24 0	23.3	1.2
2	30 04	29.74	29.927	38.5	6:30 A	29 0	0 A	33.7	34.7	34.3	0 6
3	30.03	29 72	29.867	33.0	2 A	24.0	6:30 A	28.5	24.1	27.0	0.0
4	30.14	29.81	30.061	38.0	4 P	27.5	8:30 A	32.7	31.4	29.7	3.9
5	30.14	29.45	29 788	35.0	8:30 P	32.0	0 A	33 5	33.5	33.5	0.0
6	30.10	29.45	29.910	34.0	3 P	22.0	11 P	28.0	31.2	28.0	8 2
7	30.09	29 78	29.871	43.5	3 P	23.0	1 A	33.3	32.2	29.7	7.0
8	29.99	29.74	29.880	37.0	3: 0 P	22.5	7 A	29.7	30.7	27.7	8.2
9	29.74	29.39	29.495	41.0	4 P	32.0	1 A	36.5	36.4	34.7	3.5
10	29.51	29.36	29.435	42.0	6:30 P	27.0	12 P	34 5	35.1	33.7	1.4
11	29.83	29.47	29 671	27.0	0 A	3.0	12 P	15.0	13.5	9.3	4.1
12	30.60	29.83	30.379	14.5	3 P	−1.5	7 A	6.5	5.4	3.3	8.5
13	30.66	30 43	30.584	22.0	2 P	4.5	4:30 A	13 3	13.5	14.0	0 0
14	30.51	29 87	30.181	47.5	8:30 A	17.0	10 P	32.3	28.3	32.0	2.3
15	30.74	30.51	30.681	23.5	12 M	14.0	12 P	18.7	18.9	18.3	2.3
16	30.61	30.27	30.444	26 5	3 P	13.0	1:30 A	19 7	18.9	16.5	8 2
17	30.27	29 89	30.009	33.0	3 P	12 5	7:30 A	22.7	22.3	17.3	8.4
18	29.89	29 50	29 585	32.5	3:30 P	19.5	3 A	26.0	26 5	25.0	3 0
19	30.19	29 55	29 976	25.0	0 A	7.0	10 P	16.0	15.8	12.0	8.7
20	30.20	29 99	30.102	25.5	4 P	9.0	3 A	17.3	15.8	14.7	2.1
21	30.18	29 74	30 048	24.5	1 P	13.0	0 A	18.7	18.1	17 3	1.2
22	30.01	29 38	29.656	41 0	1:30 P	16.5	3 A	28 7	23.1	18.7	3 6
23	30.37	30.01	30.291	26 0	1:30 P	4.0	6:30 A	15.0	16.0	11 0	9.0
24	30.26	29.96	30.103	29.5	3:30 P	0.0	7:30 A	14.7	14.3	11.5	6.2
25	29.96	29 76	29.818	33.0	3 P	14 0	6:30 A	23.5	22.6	20.7	4.3
26	30.26	29 81	30 024	21.0	3:30 P	4.0	7:30 A	12.5	13.5	9 3	4.3
27	30.54	30 26	30.444	29.0	4:30 P	−3 5	6 A	12 7	13.6	11.7	8 5
28	30.34	30.20	30.250	24.5	3:30 P	18.0	0:30 A	21.3	21.1	20.5	0.2
29	30.26	29.78	30.123	26.0	3:30 P	13.0	6 A	19.5	19.7	19.0	0.0
30	29.96	29.65	29 786	42.0	1:30 P	17.0	0:30 A	28 3	31.6	29.7	8.7
31	30.08	29.79	29 972	36.5	3 P	25.0	5:30 A	30.7	31.5	28.3	3.3

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	20.5	.135	87.5	S.W.	163	2.0	20	2 P				
2	32.5	.207	88 0	W.N.W.	88	0.5	10	6 A				
3	24.0	.154	86 5	E.N.E.	48	3 0	24	12 M	11 A	10 P	.55	5½
4	27.5	.172	90.0	N.N.E.	7	0.0	—	—				
5	31.5	.197	95.0	E.	71	0.5	10	8 A	10 A	11 P	1.21	
6	24.5	.167	80.5	N.N.W.	259	6.5	36	12 M				
7	27 5	.180	86 5	W.N.W.	176	10.0	45	10 P				
8	24.0	.165	81.0	W.S.W.	298	4.0	28	2 P				
9	34.0	.212	93.0	S.W.	262	4.5	30	5 A				
10	30.5	.208	86·0	W S.W.	155	5.0	32	4 P				
11	4.5	.073	76.0	N.N.W.	346	6.0	35	1 P				
12	−0 5	.055	80.5	N.W.	254	6.0	35	12 M				
13	11.5	.088	89.5	W.	22	0.0	—	—	9 A	12 P	.10	1¼
14	29.0	.211	87.5	W.	235	16.0	57	9 A	0 A	11 A	.72	
15	14.5	.108	82.0	N.N.W.	199	0.5	10	11 A				
16	10.0	.104	73.5	N.W.	126	1.5	17	5 P				
17	9 5	.109	68 0	W.N.W.	283	6.0	35	5 P				
18	13.0	.147	76.5	W.N.W.	293	5.0	32	11 P	7 A		T	T
19	5.5	.085	73.5	N.W.	391	8.5	41	0 A				
20	10.5	.092	83 0	W.	62	0.0	—	—				
21	15 5	.101	88.0	S.S.E.	32	0.0	—	—	4 P	12 P	*	*
22	12.5	.112	75.5	W.N.W.	183	10.5	46	3 P	0 A	4 A	.56	3½
23	5.0	.080	71.5	W S.W.	192	1.0	14	8 P				
24	9.0	.090	87.5	S.S.W.	40	0.0	—	—				
25	17.5	.127	81.0	S.W.	40	7.0	37	9 P	8 P	10 P	.04	½
26	8.5	.078	90.0	N.W.	104	2.5	22	9 P	12 M	3 P	T	T
27	6.5	.086	73.5	S.W.	80	1.0	14	7 P	8 P	12 P	*	*
28	18.5	.115	89 0	S.	58	0.0	—	—	0 A	10 A	.10	1
29	17.0	.109	88.5	S.	16	0.5	10	8 A	8 A	10:30P	.34	3
30	26.5	.177	82 0	N.W.	148	4.0	28	10 A				
31	25.5	.165	84.0	N.W.	130	0.5	10	5 A	7 P	12 P	.02	¼

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was generally seasonable, and abnormal features were wanting. While the last half of the month was somewhat colder than the first half there was but little zero weather. On the other hand, there were only five days when the mean hourly temperature was above the freezing point and these were all during the first third of the month. More than one-half the total precipitation was in the form of rain. While the snowfall was moderate, sleighing was possible during most of the month.

The records of the several weather elements show the following as the more important features: The mean barometer was comparatively low for this season of the year and the range about one-fifth of an inch less than usual. The fluctuations of pressure, however, were larger than usual. The maximum and minimum pressures for the month were both above the normals for these features at this station.

The maximum temperature was nearly four degrees lower than usual and the minimum more than three degrees higher than usual, giving a small range for the month. The mean hourly temperature was 1.6 degrees lower than the normal. The temperature was below zero on but two days of the month.

The mean dewpoint was practically normal, while the relative humidity was more than five points higher than the normal. The total precipitation was slightly more than usual and was well distributed throughout the month.

The total wind movement was less than normal, although there were more gales than usual. Most of the gales were from the northwest quadrant.

The amount of sunshine was comparatively small, more than half of the days being either cloudy or overcast.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Acting Observer.

MAY 1 4 1917
Agricultural College

BULLETIN No. 338. FEBRUARY, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.09, 13th, 8 A
Minimum reduced to freezing,	28.61, 5th, 11 A
Reduced† maximum reading,	30.43, 13th, 8 A
Reduced† minimum reading,	28.93, 5th, 11 A
Mean semi-daily reduced	29.930
Monthly range	1.50

***Air Temperature.** In Degrees Fahr.

Highest	46.0, 27th, 2:30 P
Lowest	−16.0, 13th, 7 A
Mean hourly	20.6
Mean of means of max. and min.	19.9
Mean sensible (wet bulb)	17.4
Monthly range	62.0
Highest mean daily	38.5, 27th
Lowest mean daily	0.8, 12th
Mean maximum	29.6
Mean minimum	10.3
Mean daily range	19.3
Greatest daily range	38.0, 13th
Least daily range	10.0, 10th

Humidity.

Mean dew point	14.2
Mean force of vapor	.117
Mean relative humidity	82.7

Precipitation. In inches.

Total precipitation, in inches	1.98
Total snow, in inches	11
Number of days on which .01 inch or more rain fell	9
Days of Sleighing	28

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	4485 m
Greatest daily movement	488m, 10th
Least daily movement	21m, 15th
Mean daily movement	174 m
Mean hourly velocity	7.3 m

Maximum pressure per square foot, 15.0 lbs = 55m per hour, 5th, 10 A, S.W.

Maximum velocity for 5 minutes 30m per hour, 5th, 2P, S.W.

Prevailing direction, West.

Summary.

South Southwest	11 per cent
West	18 " "
West Northwest	11 " "
Northwest	18 " "
Other directions	42 "

Weather.

Mean cloudiness observed	45 per cent
Total cloudiness recorded by the Sun Thermometer	116 hours = 39 per cent
Number of clear days	10
Number of fair days	13
Number of cloudy days	5

Bright Sunshine.

Number hours recorded, 180 hrs, = 61 per cent

Rain, 1st, 9th, 23d, 24th, 26th.

Snow, 1st, 4th, 5th, 9th, 19th, 20th.

Gales, 35 or more miles per hour. 43m, 2d, N.N.W.; 49m, 3d, S.S.E.; 55m, 5th, S.W.; 36m,6th,S.; 38m, 9th,S.W.; 52m,10th,N.W.; 36m,17th, S..; 39m, 23d, S.S.W.; 42m, 24th, W.; 35m, 26th, S.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.79	29.43	29.590	32.0	1:30 P	16.0	12 P	24.0	28.1	26.3	0.0
2	29.74	29.66	29.693	16.0	0 A	2.0	12 P	9.0	7.3	3.7	9.0
3	29.80	29.69	29.738	10.0	8 P	−2.0	5:30 A	4.0	4.3	4.0	7.3
4	29.69	29.32	29.550	28.0	4 P	7.0	2 A	17.5	18.1	17.2	6.8
5	29.64	28.93	29.269	29.0	8:30 A	12.0	12 P	20.5	18.9	17.7	0.0
6	30.08	29.64	29.921	28.0	2:30 P	12.0	0 A	20.0	17.9	15.5	9.3
7	30.10	29.81	30.000	31.0	8:30 P	12.0	3:30 A	21.5	22.0	21.7	4.7
8	29.81	29.68	29.738	42.5	2:30 P	25.0	3 A	33.7	33.1	30.8	6.5
9	29.68	29.13	29.365	29.0	5:30 A	12.0	12 P	20.5	26.1	21.8	0.0
10	30.04	29.37	29.893	12.0	0 A	2.0	12 P	7.0	6.9	4.4	9.5
11	30.30	30.04	30.229	16.0	3:30 P	−8.0	6:30 A	4.0	5.1	1.2	9.2
12	30.40	30.30	30.390	8.0	2:30 P	−10.0	7:30 A	−1.0	0.8	−3.3	9.0
13	30.43	30.08	30.312	22.0	4 P	−16.0	7 A	3.0	5.0	0.6	9.0
14	30.13	29.92	29.970	28.0	4 P	7.0	7:30 A	17.5	17.5	10.7	8.7
15	29.97	29.53	29.807	32.0	5:30 P	−2.0	7 A	15.0	14.9	10.0	8.3
16	29.62	29.37	29.584	32.0	4 P	7.0	8:30 A	19.5	21.1	17.1	7.0
17	29.86	29.62	29.822	36.0	3:30 P	16.0	7:30 A	26.0	27.1	23.8	7.0
18	30.20	29.76	30.040	42.0	11 A	23.0	12 P	32.5	34.3	29.1	9.7
19	30.37	30.12	30.313	30.0	4 P	13.0	8 A	21.5	21.7	19.5	7.8
20	30.12	29.76	29.885	40.0	4 P	26.0	0 A	33.0	30.2	28.0	6.5
21	30.24	29.89	30.153	30.0	4 P	13.0	7:30 A	21.5	22.8	19.3	10.0
22	30.35	30.03	30.268	25.0	3:30 P	7.0	5 A	16.0	13.4	11.7	5.5
23	30.35	29.78	30.181	38.0	3:30 P	5.0	7:30 A	21.5	25.2	20.3	6.8
24	30.10	29.66	29.853	42.0	3 P	23.0	12 P	32.5	33.7	19.3	7.0
25	30.42	30.10	30.348	28.0	3:30 P	11.0	7 A	19.5	19.0	16.2	7.8
26	30.28	29.60	29.844	43.0	7:30 P	23.0	0 A	33.0	35.6	36.0	0.0
27	30.16	29.60	29.947	46.0	2:30 P	30.0	12 P	38.0	38.5	35.0	6.4
28	30.37	30.16	30.333	33.0	4:30 P	21.0	12 P	27.0	27.8	28.3	1.3

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	23 5	.153	85.0	N.W.	121	5.5	33	6 P	0 A	9:30 A	.24	2½
2	−0.5	.056	80.0	N.N.W	176	9.0	43	9 P				
3	−0.5	.058	76.0	S.E.	178	12.0	49	2 P				
4	13.0	.108	78.5	E.S.E.	257	3.5	26	2 P	9:30 P	12 P	*	*
5	13.0	.108	78.0	S.S.W.	276	15.0	55	10 A	0 A	2 P	.34	6
6	12.0	.094	84.0	S.S.W.	200	6.5	36	6 A				
7	20.5	.125	91.0	E.S.E.	128	3.0	24	8 P				
8	28.0	.186	84.0	E.N.E.	120	1.0	14	12 M				
9	20.0	.128	91.0	W.N.W.	107	7.0	38	11 P	8 A	12 P	.28	1½
10	−0.5	.058	76.5	N.W.	488	13.5	52	11 A				
11	−3.0	.050	80.5	W.N.W.	118	3.5	26	3 P				
12	−7.0	.040	80.0	N.N.W.	141	2.5	22	1 P				
13	−4.0	.058	75.5	N.W.	42	0.5	10	4 P				
14	8.5	.076	87.0	W S.W.	52	1.0	14	3 P				
15	5 5	.084	78.0	N.	21	0.5	10	12 P				
16	13.5	.107	85.0	N.W.	97	1.5	17	10 P				
17	20.0	.139	84.5	S.	201	6.5	36	4 P				
18	27 5	.179	86.5	W.	196	4.0	28	12 M				
19	15 0	.113	81.5	N.W.	105	2.5	22	7 A	8:30 P	12 P	*	*
20	25.5	.161	87.0	W S.W.	66	4.0	28	9 P	0 A	2 A	.15	1
21	15.0	.113	79 0	W N.W	222	3.0	24	3 A				
22	9.0	.078	88.5	W.	40	0.5	10	2 P				
23	19.0	.135	91.0	S.S.W.	201	7.5	39	3 P	7 P	12 P	*	
24	26.0	.175	83 0	W.	175	9.0	42	7 P	0 A	7 A	.35	
25	11.5	.100	75.5	S.W.	196	3.0	34	0 A				
26	34.0	.223	88.5	S.	342	6.0	35	9 A	8 A	11 P	.62	
27	33 0	.212	90.5	W.	105	2.5	22	6 P				
28	19.0	.154	69.0	W.	114	1.0	14	0 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

During the month of February unusually cold weather was much in evidence; the first half of the month, especially having a number of days showing temperatures below zero. The precipitation was comparatively light, but the absence of any warm days allowed the sleighing to continue in fair condition up to the close of the month. While the amount of sunshine was rather large, it did not appear to have any effect on the general temperature.

The records of the several weather elements show a number of features of interest when compared with the normals for this station.

The mean barometer was about one-tenth of an inch below the normal, while the range was practically normal. The fluctuations in pressute were generally large, and extended over considerable periods. Both the maximum and minimum pressures were more than two-tenths lower than usual. The number of gales was large, and two showed pressures indicating velocities in excess of 50 miles per hour ; several of the gales were from the south compass points.

The mean temperature was three and one-half degrees below the normal, and minimum was about eight degrees lower than the average minimum for February. On the 12th the average of the hourly temperatures was nearly zero. The maximum temperature was about five degrees lower than usual for this feature, and occurred near the end of the month.

The mean dew point was quite low, while the relative humidity was considerably above the normal.

The total precipitation was not more than one-half the normal, and was about equally distributed between rain and snow. No storms of marked severity were noted.

The number of hours of sunshine was large, and only five cloudy and overcast days were noted.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Acting Observer.

BULLETIN No. 339. MARCH, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.20, 7th, 9 A
Minimum reduced to freezing,	29.14, 29th, 1 P
Reduced† maximum reading,	30.53, 7th, 9 A
Reduced† minimum reading,	29.44, 29th, 1 P
Mean semi-daily reduced	30.063
Monthly range	1.09

***Air Temperature.** In Degrees Fahr.

Highest	58.0, 25th, 4:30 P
	26th, 4 P.
Lowest	—2.0, 7th, 7 A
Mean hourly	33.3
Mean of means of max. and min.	33.4
Mean sensible (wet bulb)	29.7
Monthly range	60.0
Highest mean daily	44.2, 27th
Lowest mean daily	19.8, 19th
Mean maximum	41.9
Mean minimum	24.9
Mean daily range	17.0
Greatest daily range	43.0, 7th
Least daily range	6.0, 11th

Humidity.

Mean dew point	25.0
Mean force of vapor	.186
Mean relative humidity	77.8

Precipitation. In inches.

Total precipitation, in inches	3.66
Total snow, in inches	17
Number of days on which .01 inch or more rain fell	13
Days of Sleighing	11

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	3804 m
Greatest daily movement	462m, 19th
Least daily movement	14m, 3d
Mean daily movement	187 m
Mean hourly velocity	7.8 m
Maximum pressure per square foot, 10.5 lbs = 46m per hour, 6th, 0 A, N.	
Maximum velocity for 5 minutes 33m per hour, 6th, 1A, W.N.W.	
Prevailing direction, West.	

Summary.

West Southwest	13 per cent
West	13 " "
West Northwest	19 " "
Northwest	13 " "
Southwest	10 " "
Other directions	32 " "

Weather.

Mean cloudiness observed	50 per cent
Total cloudiness recorded by the Sun Thermometer	139 hours = 37 per cent
Number of clear days	13
Number of fair days	10
Number of cloudy days	8

Bright Sunshine.

Number hours recorded, 232 hrs, = 63 per cent

Rain. 4th, 8th, 11th, 12th. 17th, 20th, 24th 27th, 28th, 29th.

Snow. 3d, 4th, 5th, 11th, 14th, 15th, 17th, 18th.

Hail. 5th.

Gales. 35 or more miles per hour. 46m, 6th, N.; 39m, 12th, W.N.W.; 35m, 15th, N.W.; 35m, 18th, W.; 42m, 19th, W.N.W.; 36m, 20th, S.; 43m, 23d. W.S.W..; 35m, 24th, N.W.; 35m, 27th, S.W.; 36m, 28th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.35	30.27	30.321	36.0	3:30 P	18.0	3:30 A	27.0	27.0	24.7	6.7
2	30.48	30.35	30.448	34.0	3:30 P	23.0	6 A	28.5	28.3	24.3	6.0
3	30.33	30.21	30.282	34.0	3 P	28.0	4:30 A	31.0	30.8	29.5	3.3
4	30.21	30.10	30.173	36.0	3:30 P	29.0	12 P	32.5	31.4	29.5	3.8
5	30.10	29.53	29.776	30.0	4 A	17.0	10 P	23.5	23.4	19.7	2.2
6	30.41	29.69	30.259	31.0	4:30 P	15.0	6:30 A	23.0	20.7	17.0	10.8
7	30.53	30.24	30.458	41.0	4 P	−2.0	7 A	19.5	20.8	16.6	9.5
8	30.24	29.68	29.839	39.0	5:30 P	28.0	1:30 A	33.5	32.5	32.5	0.0
9	30.01	29.68	29.854	41.0	2:30 P	31.0	0 A	36.0	35.3	31.3	5.0
10	30.18	30.01	30.170	42.5	3:30 P	26.5	6:30 A	34.5	33.0	29.5	10.3
11	30.14	29.61	29.829	35.0	3 P	29.0	4 A	32.0	32.0	30.0	0.3
12	30.07	29.58	29.874	39.5	2:30 P	27 0	12 P	33.3	33.7	30 0	9.0
13	30.24	30.07	30.170	42.5	4 P	21.0	6:30 A	31.7	31.6	27.5	10.6
14	30.27	30.06	30.203	34.0	2 P	23.5	6 A	28.7	29.3	27.5	1.3
15	30.06	29.86	29.952	39.0	4 P	29.0	12 P	34.0	33.8	30.3	7.7
16	30.25	29.98	30.231	48.5	5 P	26.0	1:30 A	37.3	36.1	30.0	11.1
17	30.29	29.54	29.835	38.0	5 P	26.0	5 A	32.0	33.2	32.5	0.0
18	29.69	29.53	29.590	38.0	2 P	25.0	12 P	31.5	32.9	27.7	7.0
19	30.12	29.69	30.012	24.5	3:30 P	15.0	12 P	19.7	19.8	14.7	11.2
20	30.14	29.82	29.983	40.0	4:30 P	14.0	1 A	27.0	28.8	25.3	8.4
21	29.99	29.87	29.954	46.0	3 P	30.0	5:30 A	38 0	38 2	34.0	9.0
22	30.33	29.92	30.248	49 0	4:30 P	29.5	6 A	39.3	36.7	32.7	11.0
23	30.34	29 85	30.192	49.0	1 P	23.0	4:30 A	36.0	37.0	33.0	7 5
24	30.06	29.66	29.878	50.0	4:30 P	27.0	9 A	38.5	43.3	40.7	8.3
25	30.30	30 06	30.200	58.0	4:30 P	26.0	7 A	42.0	41.2	35.5	12.4
26	30.41	30.24	30.365	58.0	4 P	26.0	7:30 A	42.0	42.9	34.0	12.4
27	30.24	29.50	29.805	56.0	11 A	32.0	5 A	44.0	44.2	43 0	0.0
28	29.80	29 54	29.749	44.0	2 P	34.0	5 A	39.0	37.6	34.5	12.5
29	29.70	29.44	29.529	49.0	12 M	32 0	12 P	40.5	39.4	36.5	11.6
30	29 96	29.61	29.869	45.0	3 P	32.0	0 A	38.5	37.2	30.3	12.0
31	30.02	29-83	29.929	51.5	4:30 P	31.0	3:30 A	41.3	40.5	35.3	11.2

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	19.5	.149	76.0	W.S.W	35	1.0	14	6 P				
2	17.0	.150	66.5	W.	34	0.5	10	9 P				
3	27.5	.168	95.0	W.	14	0.0	—	—	5 A	12 P	*	*
4	27.5	.167	95.0	N.N.W	62	2.0	20	2 P	0 A	12 P	*	*
5	17.5	.112	87.0	N.N.E.	252	5.0	32	12 M	0 A	7 P	1.05	11
6	9.0	.105	69.0	W.N.W.	288	10.5	46	0 A				
7	12.5	.113	82.5	W.S.W.	55	1.5	17	5 P				
8	30.5	.189	92.5	S.	38	0.0	—	—	5 A	11:30A	.42	
9	24.5	.204	66.0	W.S.W.	256	3.5	27	12 M				
10	27.0	.170	89.5	W.N.W.	172	2.0	20	1 P				
11	26.5	.178	83.0	S.	36	0.5	10	12 M	4 A	10:30A	.28	2
12	27.5	.176	85.0	N.W.	247	7.5	39	5 P	0 A	1 A	.04	
13	19.5	.178	64.0	N.N.W.	227	3.5	27	9 A				
14	22 5	.163	75.0	W.	105	2.5	23	2 A	1 P	7:30 P	.24	2½
15	25 0	.184	74.5	N.E.	172	6.0	35	6 P	6:30A	8 A	.05	½
16	24.0	.190	69.0	W.N.W.	128	1.5	17	3 P				
17	29 5	.195	86.5	S.S.E.	134	4.5	30	12 M	11 A	10 P	.67	1
18	22.0	.169	75.5	W.	326	6.0	35	6 P	10 A			T
19	6.0	.098	62.0	W.N.W.	462	9.0	42	10 A				
20	17.5	.160	69.0	S.W.	130	6.5	36	12 M	2 P		T	
21	28.5	.221	69.5	W.N.W.	140	1.5	17	1 A				
22	29.0	.203	79.0	N.	173	3.0	24	2 P				
23	31 0	.206	87.0	E.S.E.	224	9.0	43	2 P				
24	39.0	.267	90.0	N.W.	370	6.0	35	8 A	5 A	10 A	.10	
25	32.5	.233	84 0	S.S.W.	98	4.0	28	12 M				
26	31.0	.216	81.5	S.W.	190	4.5	30	12 M				
27	40.5	.296	86.0	W.S.W.	189	6.0	35	8 P	3:30 P	12 P	*	
28	31.5	.214	82.5	N.W.	325	6.5	36	12 M	0 A	5 A	1.20	
29	31.0	.246	72.5	W.N,W.	310	3.5	26	6 A	7 A	3 P	.03	
30	19.0	.210	50.0	N.W.	280	5.0	32	11 A				
31	29.0	.240	66.5	S.W.	52	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

During the the month of March the transition from winter to spring weather was practically completed. Early in the month one of the heaviest snowstorms of the winter occurred and zero temperature was registered, while by the last week of the month nearly all of the snow had disappeared and mild, sunny days were prevalent. The melting of the snow was gradual so that the streams were less swollen than is often the case. At the close of the month the season's advance was slightly ahead of normal conditions, and much of the frost was out of the ground.

The records of the several weather elements show the following interesting features: The mean barometer was considerably higher than the normal and the range less that usual. While the wind movement was rather large it was due to many moderate gales rather than extremely high velocities.

The maximum temperature was about four degrees lower than the normal while the minimum was more than six degrees lower than usual, giving a rather large range. The mean temperature was less than a degree below the normal.

The mean dew point was rather low and the relative humidity about three points above the normal for this station.

The total precipitation was about ninety per cent. of the normal. The most severe storms were a heavy snowfall of more than two days duration, shortly after the opening of the month and a heavy rainstorm, mostly during the night of the 27th.

The amount of sunshine was considerably more than the normal and about three-fourths of the days were either clear or fair.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

BULLETIN No. 340. APRIL, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.03, 17th, 8 A
Minimum reduced to freezing,	28.93, 6th, 5 P
Reduced† maximum reading,	30.33, 17th, 8 A
Reduced† minimum reading,	29.24, 6th, 5 P
Mean semi-daily reduced	29.925
Monthly range	1.09

***Air Temperature.** In Degrees Fahr.

Highest	71.0, 19th, 4 P
Lowest	25.0, 15th, 6 A
Mean hourly	42.9
Mean of means of max. and min.	42.1
Mean sensible (wet bulb)	39.1
Monthly range	46.0
Highest mean daily	58.3, 22d
Lowest mean daily	31.0, 9th
Mean maximum	53 0
Mean minimum	34.2
Mean daily range	18.8
Greatest daily range	35.0, 25th
Least daily range	7.0, 30th

Humidity.

Mean dew point	34.3
Mean force of vapor	.279
Mean relative humidity	74.6

Precipitation. In inches.

Total precipitation, in inches	1.83
Total snow, in inches	Trace
Number of days on which .01 inch or more rain fell	10

*Temperature in ground shelter.

† Reduced to freezing and sea-level.

Wind.

Total movement	3853 m
Greatest daily movement	611m, 11th
Least daily movement	14m, 1st
Mean daily movement	128 m
Mean hourly velocity	5.3 m

Maximum pressure per square foot, 35.0 lbs = 84m per hour, 10th, 3 P, N.W.

Maximum velocity for 5 minutes 40m per hour, 10th, 3 P, N.W.

Prevailing direction, West Northwest.

Summary.

Northwest	33 per cent
West Northwest	17 " "
South	13 " "
Other directions	37 " "

Weather.

Mean cloudiness observed	46 per cent
Total cloudiness recorded by the Sun Thermometer	108 hours = 27 per cent
Number of clear days	16
Number of fair days	10
Number of cloudy days	4

Bright Sunshine.

Number hours recorded, 294 hrs, = 73 per cent

Rain, 1st, 6th, 7th, 12th, 18th, 20th, 21st, 26th, 27th, 29th, 30th.

Snow, 12th, 27th.

Thunder and Lightning, 21st.

Gales, 35 or more miles per hour. 40m, 4th, N.W.; 36m, 7th, N.W.; 39m, 9th, N.N.W.; 84m, 10th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.97	29.81	29.900	66 0	2:30 P	37.0	5:30 A	51.5	49.5	44.5	9.2
2	30.01	29.91	29.974	47.0	4 P	37.0	12 P	42.0	40.9	37 0	7.3
3	30.21	29.94	30.126	51 0	3:30 P	35.0	5:30 A	43.0	41.5	36.7	9.7
4	30.28	30.23	30.281	54.0	5 P	32.5	3 A	43.3	42.0	36.3	12.4
5	30.22	29.73	30.020	53.0	3 P	27.0	5 A	40.0	40.8	37.7	10.0
6	29.73	29.24	29.347	42.0	2 P	33.0	3:30 A	37.5	38.7	37 0	0.0
7	29.80	29 26	29 544	45.5	11:30 A	35.5	4 A	40.5	39.2	35.5	7.0
8	29.91	29.79	29.890	46.0	3 P	30.0	6 A	38.0	37.3	29.0	11.8
9	29.79	29.62	29 664	46.0	3 P	30.0	6 A	38.0	31.0	27.7	7.2
10	29.72	29.56	29.686	40.0	3 P	28.0	11 P	34.0	32.1	27.7	12.3
11	29.85	29.56	29.736	59.0	3 P	30 0	6 A	44.5	42.1	34.7	12.7
12	29.85	29 65	29.733	44.0	4:30 P	33.0	6 A	38.5	37.7	35.0	5.0
13	29.68	29 59	29.664	44.0	4:30 P	32.0	12 P	38.0	39.0	33 5	12.0
14	29.77	29.65	29.738	50 0	3 P	27.0	5 A	38.5	38.4	34.5	7.5
15	29.90	29 77	29.834	47.0	3:30 P	25.0	6 A	36.0	36.5	31.3	12.3
16	30.19	29.90	30.117	44.5	4 P	34.0	1 A	39.3	39.1	36.0	12.4
17	30.33	30.19	30.305	62.0	5 P	35.0	6 A	48.5	47.0	42.7	12.8
18	30.28	30.10	30.180	55.0	5 P	32.0	5:30 A	43.5	44.0	41.0	11.5
19	30.12	30.00	30.065	71.0	4 P	43.0	5 A	57.0	54.0	48.5	8.8
20	30.16	30 08	30.122	50.0	2 P	42.5	6 P	46.3	46.6	44.3	4 0
21	30.03	29 70	29.858	62.0	5:30 P	43.0	3 A	52.5	51.5	50.7	13.5
22	29.94	29 84	29 896	70 0	3 P	42 0	5:30 A	56.0	58.3	58 7	13.5
23	29.98	29.82	29.925	66.0	8:30 A	43.0	2 A	54.5	52.8	51.7	12.1
24	30.06	29 86	29 951	60.0	4:30 P	35.0	1:30 A	47.5	46 4	41.3	13.6
25	30.14	30.03	30.114	62.0	5 P	27.0	5:30 A	44.5	43.7	37.7	12.7
26	30.14	30.04	30.092	45.5	2 P	35 5	2:30 A	40.5	39.5	36.5	4.2
27	30.08	29.99	30.012	43 0	3:30 P	35.0	7 A	39.0	39 0	37.7	5.9
28	30.01	29 85	29.940	58.0	3 P	34.0	5:30 A	46.0	46.0	40.5	12.7
29	30.00	29.94	30.010	58.0	12 M	31.0	4:30 A	44.5	47.8	46 3	12.8
30	30.04	29.97	30.011	48.0	1 P	41.0	7 A	44.5	44 0	40.0	8.1

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	42.5	.322	85.5	S.W.	14	0.5	10	7 P	3 A	6 A	.23	
2	35.0	.234	85.5	E.	38	3.0	24	11 A				
3	30.0	.256	67.0	N.W.	64	4.0	28	7 P				
4	29 5	.242	69 5	N.W.	163	8.0	40	6 P				
5	34.0	.253	78.5	N.W.	230	3.0	24	10 P				
6	35.5	.229	89.5	N.N.E.	118	3.5	26	6 A	0 A	12 P	*	
7	31.5	.230	76.5	N.W.	153	6.5	36	2 P	0 A	8 A	.87	
8	19.5	.196	54.0	N.W.	196	3.5	26	2 P				
9	26.0	.158	89.0	N.N W.	300	7.5	39	4 P				
10	16.0	.182	59.5	N.W.	306	35.0	84	3 P				
11	24.0	.256	56.5	W.N.W.	611	3.0	24	2 P				
12	30.5	.230	74.5	W.N.W.	309	0.5	10	3 P	6 A	1 P	T	T
13	27 5	.224	66.0	S.W.	17	2.0	20	3 P				
14	28.5	.232	66.5	W.N.W.	67	2.0	20	1 P				
15	24.5	.207	64 5	W.	71	2.5	22	2 P				
16	31.5	.236	76.5	W.	87	3.0	24	2 P				
17	35.5	.346	61.0	W.N.W.	125	1.0	14	11 A				
18	37.0	.298	74.5	W.N.W.	16	0.5	10	12 M	11 A	1 P	.01	
19	45 5	.392	77.0	N.W.	59	1.5	17	3 P				
20	42.5	.263	89.0	E.S.E.	121	3.0	24	2 P	2 A	12 P	*	
21	50 0	.388	95.0	S.S.E.	45	1.0	14	6 P	0 A	11 P	.48	
22	57.0	.513	95.5	N.W.	83	4.0	28	12 M				
23	50.0	.434	85.5	N.W.	81	3 0	24	1 P				
24	33.5	.324	59.0	N.	140	5.0	32	5 A				
25	31.5	.316	56.0	N.W.	84	4.5	30	8 P				
26	32.5	.238	77.0	S.W.	75	3.5	26	3 P	5 A	12 P	*	
27	36 0	.236	90.0	S.W.	17	0.0	—	—	0 A	6 P	.20	T
28	34.0	.305	64.5	N.N.E.	170	2.0	20	9 A				
29	41.5	.370	71.0	E.	46	1.0	14	4 P	1 P	12 P	*	
30	37 0	.268	82.5	S.	47	1.0	14	2 P	0 A	6 P	.04	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during April was a disappointment from the standpoint of seasonal progress. At the beginning of the month conditions were somewhat in advance of the normal, but so little progress was made during the month owing to abnormally cool weather that the month closed with the season's progress more than a week backward. The last five days of the month averaged nearly the same temperature as the first five days. The precipitation was comparatively small and without any storms of much severity.

The records of the several weather elements compared with the normals, show the following more important features of the month. The mean barometer was considerably below the normal and the maximum and minimum pressures were both comparatively low records. The range of pressure was practically normal. The total wind movement was about three-fourths of the usual amount notwithstanding the unusually large daily movements from the 9th to the 12th inclusive. Tne record of the 11th was exceptionally large for this station.

The mean temperature was about three and one-half degrees below the normal, making it one of the coldest Aprils on our records. The maximum temperature was more than eight degrees lower than usual, while the minimum was rather high, making a very small range for the month.

The mean dew point was slightly below the normal, while the relative humidity was several points above the normal.

The total precipitation was about sixty per cent of the normal and a trace of snow was noted near the end of the month. The sunshine record was comparatively high.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

ERRATUM: Total precipitation on first page of bulletin No. 339, for March, should read 4.08.

BULLETIN No. 341. MAY, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.97, 31st, 8 A
Minimum reduced to freezing,	29.17, 11th, 1 P
Reduced† maximum reading,	30.27, 31st, 8 A
Reduced† minimum reading,	29.47, 11th, 1 P
Mean semi-daily reduced	29.809
Monthly range	0.80

***Air Temperature.** In Degrees Fahr.

Highest	81.0, 19th, 4:30 P
Lowest	28.5, 4th, 6 A
Mean hourly	49.3
Mean of means of max. and min.	49.5
Mean sensible (wet bulb)	44.4
Monthly range	52.5
Highest mean daily	62.7, 19th
Lowest mean daily	38.6, 5th
Mean maximum	59.3
Mean minimum	39.7
Mean daily range	19.6
Greatest daily range	37.0, 18th
Least daily range	5.5, 27th

Humidity.

Mean dew point	39.2
Mean force of vapor	.357
Mean relative humidity	70.4

Precipitation. In inches.

Total precipitation, in inches	4.13
Number of days on which .01 inch or more rain fell	13

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	4610 m
Greatest daily movement	312m, 6th
Least daily movement	16m, 27th
Mean daily movement	147 m
Mean hourly velocity	6.1 m

Maximum pressure per square foot, 9.5 lbs = 44m per hour, 15th, 7 A, N.N.W.

Maximum velocity for 5 minutes 27m per hour, 12th, 2 P, N.N.W.

Prevailing direction, Northwest.

Summary.

North Northwest	32 per cent
West Northwest	16 " "
West	13 " "
Other directions	39 " "

Weather.

Mean cloudiness observed	50 per cent
Total cloudiness recorded by the Sun Thermometer	136 hours = 30 per cent
Number of clear days	14
Number of fair days	10
Number of cloudy days	7

Bright Sunshine.

Number hours recorded, 317 hrs, = 70 per cent

Rain, 1st, 2d, 4th, 5th, 6th, 9th, 10th, 12th, 13th, 22d, 23d, 24th, 27th, 28th, 29th.

Snow, 5th.

Thunder and Lightning, 28th.

Hail, 5th, 12th.

Frosts, 4th, 16th, 18th.

Gales, 35 or more miles per hour. 41m, 10th, W.N.W.; 36m, 12th, N.N.W.; 35m, 13th, N.N.W.; 38m, 14th, N.N.W.; 41m. 15th, N.N.W.; 37m, 19th, S.W.; 41m, 25th, N.W.; 35m, 26th. W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.00	29.78	29.904	44.0	1 A	37.0	12 P	40.5	39.5	37.0	0.0
2	29.82	29.70	29.764	51.5	2:30 P	35.0	6 A	43.3	41.7	38.0	8.9
3	29.98	29.81	29.910	46.0	4 P	37.0	12 P	41.5	41.3	36.7	6.8
4	30.01	29.90	29 975	62.0	4 P	28.5	6 A	45.3	46.3	40.7	12.5
5	29.94	29.85	29.892	42.0	3 P	36.0	6:30 A	39.0	38.6	36.7	3.2
6	30.11	29.91	30.054	50.0	3 P	36.0	6 A	43.0	41.7	38.0	7.0
7	30.14	30.07	30.101	56.5	2:30 P	37.5	5:30 A	47.0	46.5	40.0	8.5
8	30.06	29.76	29.917	53.0	12 M	40.5	5:30 A	46.7	46.4	42.7	8.2
9	29.76	29.57	29.642	59 0	12 M	40.0	3:30 A	49.5	47.8	43.7	10 0
10	29.58	29.50	29.540	55.0	2:30 P	38.0	3 A	46.5	47.2	42.5	11.5
11	29.53	29.47	29.523	51.0	10:30 A	40.0	10 P	45.5	44 9	39.3	1.7
12	29.63	29.53	29.588	57.0	1 P	38.0	4:30 A	47.5	45.1	41.7	11.2
13	29.69	29.63	29.674	58.0	2 P	39.5	1 A	48.7	48.4	46.0	11.7
14	29.65	29.48	29.568	72.0	3 P	46.0	4 A	59.0	58.1	50.5	13.0
15	29.78	29 54	29.729	59 0	3:30 P	37.0	11 P	48.0	46.5	37.3	13.5
16	29 75	29.54	29.642	59.0	12:30 P	30 0	5 A	44.5	44.6	36.3	12.1
17	29.85	29.55	29.744	67.0	4:30 P	41.0	1:30 A	54.0	53.8	46 7	13.6
18	29 97	29.72	29.844	72.0	2:30 P	35.0	5 A	53.5	55.2	49.7	12.0
19	29.92	29.70	29.847	81.0	4:30 P	45.0	5:30 A	63.0	62.7	54.7	13.2
20	29.78	29.59	29 675	80.0	2 P	50.0	5:30 A	65.0	62.5	53.5	12.1
21	29.96	29.78	29.926	69 0	5 P	43.0	5:30 A	56.0	57.3	49 0	13.1
22	29 97	29.82	29.928	55.0	0 A	46.0	7 A	50.5	49.0	46.3	2.3
23	29.82	29.63	30.680	50.0	5 P	43.0	5:30 A	46.5	46.4	45.3	1.3
24	29.70	29.57	29.629	58.0	4 P	39 0	5:30 A	48.5	49.6	45.7	10.8
25	29.76	29.62	29.682	57.0	4 P	39 0	5 A	48.0	48.7	43.5	13.3
26	29.85	29.76	29.842	69 0	4 P	42.0	5 A	55.5	57.4	53.0	13.6
27	29.82	29.71	29.794	54.5	8:30 A	49.0	5:30 A	51.7	52.8	51.5	0.4
28	29.96	29.79	29.914	54.0	12 M	41.0	12 P	47.5	48.7	44.5	6.1
29	29.89	29.70	29.784	50.0	4 P	41.0	0 A	45.5	46.1	43.5	3.1
30	30.19	29.80	30.162	72.0	4 P	40 0	2:30 A	56.0	54.0	50.3	13.0
31	30.27	30.15	30.218	76.0	1:30 P	40.0	5 A	58.0	59.1	51.7	13.6

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	35.0	.238	84.0	S.S.E.	43	1.5	17	10 P	6:30 A	12 P	*	
2	33.5	.261	75.0	W.N.W.	187	3.0	24	11 A	0 A	5 A	.42	
3	30.5	.253	68.0	W.N.W.	237	2.5	22	8 A				
4	35.0	.314	65.0	W.N.W.	25	1.0	14	7 P	11 P	12 P	T	
5	34.5	.230	87.5	N.E.	148	3.0	24	3 P	0 A	12 P	*	T
6	34.5	.252	80.0	N.N.E.	312	2.5	22	9 A	0 A	5 A	.90	
7	34.5	.298	68.0	N.N.W.	25	1.0	14	2 P				
8	39.5	.302	80.0	S.	55	1.0	14	12 M				
9	39.5	.238	69 5	N.N.W.	92	3.0	24	1 P	12 M	8 P	.02	
10	34.5	.344	57.0	W.N,W.	257	8.5	41	2 P	10 A	4 P	.03	
11	33.0	.284	66.5	W.N.W.	270	4.5	30	12 M				
12	38.0	.297	78.5	N.N.W.	184	6.5	36	1 P	10 A	12 P	.10	
13	42.0	.350	75.5	N.	216	6.0	35	3 P	0 A	8 A	.01	
14	42.0	.506	52.5	N.N.W.	187	7.5	38	11 A				
15	25.0	.278	53.0	N.N.W.	294	9.5	44	7 A				
16	30.5	.292	58.5	N.W.	168	4.5	30	3 P				
17	40.0	.420	58.5	N.N.W.	162	4.5	30	10 A				
18	41.5	.426	61.5	W.S.W.	115	4.0	28	2 A				
19	46 5	.588	55.0	S.S.W.	192	7.0	37	7 P				
20	48.5	.512	67.5	W.	202	5.5	33	4 P				
21	42.5	.442	62.5	N.N.W.	155	3.5	26	9 A				
22	44.0	.341	84.5	E.N.E.	50	1.0	14	3 P	2 A	12 P	.65	
23	43.5	.317	89.0	E.N.E.	70	0.5	10	6 P	0 A	3 P	.28	
24	39.0	.382	63.0	W.	140	4.5	30	12 M	7 P		T	
25	36.5	.353	61.5	N.W.	242	8.5	41	3 P				
26	46.5	.444	68.0	W.	209	6.0	35	12 M				
27	49.0	.415	85.0	W.	16	0.0	—	—	8 A	12 P	.59	
28	42.0	.330	80.0	N.	73	1.0	14	6 P	0 A	12 P	.96	
29	41.5	.312	82.5	N.N.W.	119	1.0	14	3 A	0 A	12 M	.17	
30	46.5	.433	73.5	N.N.W.	69	2.0	20	6 P				
31	47 0	.463	70.5	N.N.W.	96	3.5	26	7 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The one predominating feature of the weather during May was the abnormal temperature which prevailed throughout the month. The mean hourly temperature was more than eight degrees below the normal at this station and two and one-half degrees below the record of 1907 which was the coldest May up to that time since this station was established. Using the maximum and minimum records of Professor Snell of Amherst College, which go back to 1837, we find no records which indicate a colder May than 1907, up to this year. It is therefore evident that the month was the coldest May for at least eighty years. There were only four days in the month when the mean hourly temperature was higher than normal May weather.

As a result of the unseasonable temperature, seasonal progress was almost at a standstill during the month, and at its close vegetation was more than three weeks backward. The persisteney of the wind from the northwest quadrant during much of the month undoubtedly had much to do with the low temperature.

A comparison of the records of the several weather elements with the normals shows the following features: The mean barometer was the lowest since this station was established and the range was slightly smaller than usual. The barometer chart showed a comparatively steady pressure. The maximum temperature was six degrees lower than the normal but was higher than the 1915 record and almost the same as the 1916 record. While the maximum temperature was a few degrees lower than usual, it was not as low as in 1907, 1911, and 1914 of recent years.

The mean dew point was about as much below the normal as the mean temperature and made a new low record here. The relative humidity was nearly normal.

The total precipitation was four-tenths of an inch more than the normal. The total wind movement was practically normal. The cloudiness observed was about the usual amount.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

BULLETIN No. 342. JUNE, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.04, 13th, 7 A
Minimum reduced to freezing,	29.46, 29th, 8 P
Reduced† maximum reading,	30.33, 13ht, 7 A
Reduced† minimum reading,	29.75, 3rd, 3 P, 29th, 8P
Mean semi-daily reduced	29.995
Monthly range	58.0

***Air Temperature.** In Degrees Fahr.

Highest	88.0, 22d, 2 P
Lowest	50.0, 18th, 2 A
Mean hourly	65.3
Mean of means of max. and min.	66.3
Mean sensible (wet bulb)	60.1
Monthly range	38.0
Highest mean daily	72.6, 20th
Lowest mean daily	55.4, 1st
Mean maximum	76.3
Mean minimum	56.0
Mean daily range	20.3
Greatest daily range	33.0, 22d
Least daily range	6.0, 11th

Humidity.

Mean dew point	57.4
Mean force of vapor	.611
Mean relative humidity	78.3

Precipitation. In inches.

Total precipitation, in inches	5.27
Number of days on which .01 inch or more rain fell	16

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	2081 m
Greatest daily movement	176m, 5th
Least daily movement	5m, 11th
Mean daily movement	69 m
Mean hourly velocity	2.9 m
Maximum pressure per square foot, 8.0 lbs = 40m per hour, 3rd, 6 P, N.W.	
Maximum velocity for 5 minutes 27m per hour, 3rd, 6 P, .N.W.	
Prevailing direction, Northwest.	

Summary.

North Northwest	20 per cent
South	17 " "
Southwest	17 " "
West Southwest	10 " "
South Southwest	10 " "
Other directions	26 " "

Weather.

Mean cloudiness observed	49 per cent
Total cloudiness recorded by the Sun Thermometer	207 hours = 45 per cent
Number of clear days	6
Number of fair days	15
Number of cloudy days	9

Bright Sunshine.

Number hours recorded, 250 hrs, = 55 per cent.

Rain, 3d, 5th, 6th, 7th, 8th, 10th, 11th, 12th, 14th, 15th, 16th, 17th, 22d, 24th, 25th, 26th, 27th, 29th.

Thunder and Lightning, 7th, 8th, 14th, 22d, 24th, 26th, 27th, 29th.

Gales, 35 or more miles per hour. 40m, 3d, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean, Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.21	30.02	30.087	58.0	12 M	51.0	3 A	54.5	55.4	54 5	4.7
2	30.02	29.94	29 983	70.0	1 P	56.0	0 A	63.0	62.3	59 7	5.7
3	30.03	29.75	29.907	83.0	3:30 P	59 0	6 A	71.0	65.3	57.3	9.4
4	30.17	30.03	30.107	80.0	3:30 P	56.0	5 A	68.0	65.7	57.5	13.8
5	30.14	29.88	29.982	79.5	1:30 P	50.5	5 A	65.0	63.5	57.5	10.4
6	30.04	29.94	29.982	78.0	3:30 P	56.0	1 A	67.0	65.2	60 0	11.1
7	30.02	29.86	29.906	62.0	2 P	54.0	4 A	58 0	59.4	58.7	0.3
8	29.92	29.80	29.836	77.0	3 P	55 0	5 A	66.0	65.1	60.5	11.0
9	29.94	29.85	29.868	81 0	5 P	59 0	3:30 A	70.0	69.3	62.7	11.2
10	29.95	29.90	29.930	64.0	10:30 A	55.0	12 P	59.5	60.2	58.3	0.0
11	30.13	29 99	30.048	60.0	4 P	54.0	3:30 A	57.0	56.3	55.0	0.0
12	30.31	30.13	30.259	76.0	3:30 P	53.0	6 A	64.5	61.6	57.0	8.5
13	30.33	30.10	30 230	81.0	3:30 P	59 0	4 A	70.0	67.1	62.0	9.6
14	30.10	29.77	29 856	76 5	1:30 P	59.0	5 A	67.7	64.8	61.7	4.5
15	29.97	29 82	29.876	76.0	3 P	57.5	6 A	66.7	64.5	60.0	8.3
16	30.17	29.95	30.054	72.0	3:30 P	58.0	12 P	65.0	64.3	62.3	6.0
17	30.18	30.02	30.068	66.0	3 P	54.0	11:30 P	60.0	57.6	52.5	4.1
18	30.10	30.05	30.075	80.0	3 P	50.0	2 A	65.0	66.3	61 5	12.7
19	30 08	29.97	30.036	85.0	4 P	56.0	5 A	70.5	70.9	65.3	11.5
20	30.02	29.92	29.971	86.0	3 P	62 5	4 A	74.3	72.6	62.3	11.4
21	30.04	29.96	29.992	85.0	3 P	60.0	4 A	72.5	70 8	63.5	11.0
22	30 04	29.93	29.976	88.0	2 P	55.0	4 A	71.5	71.1	64 5	9.8
23	30.02	29 90	29.963	81.0	4 P	59.0	4:30 A	70.0	71.1	61.5	12.6
24	30.04	29.79	29.853	76.0	3:30 P	56.0	5:30 A	66.0	65.2	59.0	8.7
25	30.20	30.03	30.134	79.0	3:30 P	53.0	4:30 A	66.0	64.2	59.0	9.9
26	30.23	30.05	30.149	79 0	11 A	50.5	5 A	64.7	66.0	60.3	6.5
27	30.10	29.91	29.929	83.0	2:30 P	62.0	3 A	72.5	71.1	64 5	12.2
28	29.97	29.92	29 954	82.5	2:30 P	56 0	4 A	69.3	69.8	60.5	12.3
29	30 02	29.75	29 866	70.0	0:30 P	59.5	2 A	64.7	65.2	64.0	0.7
30	30.05	29.84	29.960	76.0	3 P	56.0	5 A	66.0	65.6	60.0	12.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	52.5	.461	85.5	S.	150	2.0	20	12 M				
2	59.0	.552	89.5	S.W.	17	0.0	—	—				
3	55.0	.538	80.5	W.N.W.	145	8.0	40	6 P	8 A	10 A	.03	
4	53.0	.625	63.5	W.N.W.	90	2.0	20	6 A				
5	54.5	.555	76.5	S.W.	176	5.5	33	2 P	6 P	12 P	.24	
6	57.0	.634	74.0	W.N.W.	71	4.0	28	10 P	0 A	6 A	.13	
7	58.0	.516	93.0	S.	41	1.0	14	4 A	1 A	12 P	.60	
8	58.5	.600	82.5	S.W.	116	5.0	32	4 P	0 A	4 P	.06	
9	59.5	.689	74 0	S.S.W.	48	1.5	17	12 M				
10	57.5	.518	80.5	S.E.	22	0.5	10	10 A	7 A	12 P	.29	
11	54.0	.465	88.5	N.E.	5	0.0	—	—	0 A	12 P	.60	
12	55.5	.527	85.5	N.E.	6	0.0	—	—	0 A	8 A	1.10	
13	60.0	.621	85.0	S.E.	57	3.0	24	6 P				
14	61.0	.586	90.5	S.S.W.	91	2.0	20	2 P	2 P	7 P	.21	
15	58.5	.578	84.5	W.S.W.	13	0.5	10	6 P	2 A	8 A	.05	
16	61.0	.602	88.5	S.	21	1.5	17	4 P	10 A	12 P	.12	
17	51.0	.458	80.0	N.	129	4.0	28	4 P	0 A	5 P	.41	
18	57.5	.670	72.0	W.S.W.	98	3.0	24	12 M				
19	62 0	.766	72.0	S.S.W.	44	1.5	17	1 P				
20	56.5	.738	62 0	S.	137	4.5	30	3 P				
21	59.5	.694	75.5	S.	92	2.5	22	7 P				
22	61.5	.720	76.0	S.W.	32	1.0	14	3 P	4 P	5 P	T	
23	55.5	.763	58.0	W.N.W.	48	1.5	17	3 P				
24	57.0	.574	86.5	W.N.W.	42	1.5	17	3 P	1 A	6 A	40	
25	56.0	.586	77.0	N.N.W.	18	1.0	14	4 P	10 A	11 A	T	
26	56.5	.651	69.5	S.W.	76	5.0	32	7 P	10 P	12 P	.17	
27	61.0	.678	72.5	W.S.W	162	5.0	32	1 A	0 A	1 A	.18	
28	54.5	.717	59.5	W.N.W.	12	0.0	—	—				
29	63.0	.642	89.5	W.	20	1.0	14	7 P	7 A	7 P	.68	
30	56 5	.608	76.0	W.	102	2.0	20	6 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during June was much nearer normal than that of the preceding month and furnished but few features of special interest. The backwardness of the season which was so pronounced at the beginning of the month was much less noticeable when the month closed, although some maturing crops were still more than two weeks behind their normal progress. The precipitation was much greater than usual and the range of temperature unusually small.

A comparison of the records of the several weather elements with the normals of our twenty-five year summary, shows the following features of more or less interest: The mean barometer was slightly higher than the normal and the range unusually small. Owing to the steady pressure of the atmosphere the wind movement was but little more than one-half the usual amount and but a single gale was recorded on the pressure chart.

The mean temperature was practically normal, and the range the smallest of any June on our records. The maximum temperature was about three degrees lower than normal and the minimum was more than ten degrees higher than usual, making it our highest June minimum.

The mean dew point was practically normal and the relative humidity a few points higher than usual.

The total precipitation was more than sixty per cent above the normal and was well distributed,—a measurable amount occurring on more than half the days of the month.

The amount of sunshine was slightly less than normal.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

BULLETIN No. 343. JULY, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.93, 25th, 8 A
Minimum reduced to freezing,	29.36, 12th, 4 A
Reduced† maximum reading,	30.22, 25th, 8 A
Reduced† minimum reading,	29.66, 12th, 4 A
Mean semi-daily reduced	29.948
Monthly range	0.56

***Air Temperature.** In Degrees Fahr.

Highest	98.5, 31st, 5 P
Lowest	51.5, 6th, 5 A
Mean hourly	71.7
Mean of means of max. and min.	72.5
Mean sensible (wet bulb)	66 2
Monthly range	47.0
Highest mean daily	86.4, 31st
Lowest mean daily	60.4, 11th
Mean maximum	83.1
Mean minimum	61.9
Mean daily range	21.2
Greatest daily range	33.5, 6th
Least daily range	9.0, 11th

Humidity.

Mean dew point	63.9
Mean force of vapor	.764
Mean relative humidity	79.4

Precipitation. In inches.

Total precipitation, in inches	3.36
Number of days on which .01 inch or more rain fell	8

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	2133 m
Greatest daily movement	242m, 19th
Least daily movement	5m, 17th
Mean daily movement	68.8 m
Mean hourly velocity	2.9 m

Maximum pressure per square foot, 10.0 lbs = 44m per hour, 18th, 10 P, S.S.W.

Maximum velocity for 5 minutes 24m per hour, 19th, 2:30 P, S.S.W.

Prevailing direction, Southwest.

Summary.

South Southwest	26 per cent
Southwest	23 " "
Other directions	51 " "

Weather.

Mean cloudiness observed	48 per cent
Total cloudiness recorded by the Sun Thermometer	177 hours = 38 per cent
Number of clear days	5
Number of fair days	22
Number of cloudy days	4

Bright Sunshine.

Number hours recorded, 285 hrs, = 62 per cent.

Rain, 2d, 9th, 11th, 12th, 13th, 14th, 15th, 17th, 18th, 19th, 21st, 24th, 29th.

Thunder and Lightning, 15th, 17th, 21st, 24th.

Hail, 21st.

Gales, 35 or more miles per hour. 35m, 17th, W.; 44m, 18th, S.S.W.; 36m, 19th, S.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.04	29.89	29.976	78.0	3 P	55.5	2:30 A	66.7	69.6	65.3	11.4
2	29.89	29.78	29.818	89.0	3:30 P	65.0	5:30 A	77.0	75.3	67.7	9.3
3	29.94	29.82	29.891	88.0	0:30 P	65.0	5:30 A	76.5	70.4	63.7	7.2
4	30.05	29.90	29.968	82.0	3 P	62.0	6 A	72.0	70.5	63.5	11.3
5	30.12	30.04	30.082	83.5	5 P	54.0	4 A	68.7	69.3	61.5	12.6
6	30.14	30.11	30.127	85.0	4 P	51.5	5 A	68.3	68.8	61.7	11.5
7	30.17	30.07	30.132	84.5	3 P	55.5	4:30 A	70.0	70.0	62.5	11.5
8	30.11	30.02	30.075	81.0	0:30 P	57.0	5 A	69.0	68.9	61.3	9.6
9	30.02	29.89	29.940	74 0	4 P	61.0	4:30 A	67.5	66.9	60.5	10.2
10	29.92	29.84	29.882	71.0	11 A	58.0	4:30 A	64.5	64.5	60.3	7.9
11	29.86	29.69	29.742	66.0	11 A	57.0	12 P	61.5	60.4	57 7	1.5
12	29.77	29.66	29.706	70.0	0:30 P	56.5	1 A	63.3	63.7	61.0	4.8
13	29.87	29.73	29 802	83.0	2 P	63.0	6 A	73.0	71.1	65.3	9.4
14	29.89	29.81	29.874	81.0	3:30 P	62.0	5 A	71.5	69 1	65.7	6.1
15	29.90	29 82	29.865	78.0	3:30 P	62.0	5 A	70.0	67.7	63 7	8.6
16	30.03	29.90	29.962	83.0	1 P	56.0	5 A	69 5	70.0	62.7	11.3
17	30.13	30.02	30.049	79.0	4 P	58.0	2 A	68.5	68.3	65.5	8.7
18	30.08	30.04	30.062	82.0	1 P	65.0	0 A	73.5	73.0	69.5	8.6
19	30.12	30.06	30.097	81.0	12 M	59 5	5 A	70.3	73.6	70.0	7.8
20	30.14	30.05	30.104	87.0	3:30 P	66.5	1 A	76.7	74.6	69.0	10.3
21	30 10	30.00	30 052	82.5	12 M	66.5	12 P	74.5	70.4	66.7	5 7
22	30.00	29.88	29 938	89 0	3:30 P	66.0	5 A	77.5	76.2	69.7	10.7
23	29.94	29.88	29.916	93.0	3 P	69.0	5:30 A	81 0	78.5	72.0	10.8
24	30.15	29.94	30.060	88.0	2:30 P	66.0	12 P	77.0	73.5	69.7	5.5
25	30.22	30.15	30.187	89.0	3 P	62.0	5 A	75.5	74.5	69.7	13.0
26	30.17	29.87	30.020	88.5	2:30 P	70.0	6 A	79.3	77.4	71.0	9.8
27	29.87	29.69	29.734	88.0	1 P	66.0	12 P	77.0	77 0	69.0	8.0
28	29.97	29.77	29.920	79.0	4 P	58.5	6 A	68.7	70.0	66.5	12.2
29	29.95	29.73	29.847	79.0	4 P	63.0	3 A	71.0	70.9	67.0	4.9
30	29.78	29.68	29.744	96.0	4 P	68.0	3 A	82.0	83.4	76.5	12.7
31	29 86	29.70	29.817	98.5	5 P	75.0	12 P	86.7	86.4	75.5	12.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	63.5	.753	79.0	S.W.	71	2.5	22	5 P				
2	66.5	.770	84.0	S.S.W.	86	2.5	22	5 P	5 A	6 A	.06	
3	60.5	.718	75.0	S.	39	1.0	14	4 P				
4	60.0	.722	72.5	S.W.	47	1.0	14	4 P				
5	56.5	.723	63.5	N.W.	47	0.5	10	10 A				
6	58.0	.675	72.0	W.N.W.	15	0.0	—	—				
7	59.0	.712	70.0	W.S.W.	45	0.0	—	—				
8	57.0	.677	69.0	S.S.W.	79	2.0	20	1 P				
9	57.0	.624	76.0	S.E.	71	2.0	20	12 M	10 A	4 P	T	
10	56 5	.643	70.0	E.	25	0.0	—	—				
11	55.5	.520	85.0	E.	37	0.0	—	—	10 A	8:30 P	.95	
12	60.0	.580	89.5	S.S.E.	83	1.5	17	4 P	10 A	5 P	T	
13	63.5	.690	84.5	S.W.	36	0.0	—	—	4 A	5 A	.01	
14	64.5	.696	86.5	S.W.	70	3.0	24	9 P	7:30 A	11 P	.10	
15	62 5	.637	88.5	S.	94	1.0	14	2 P	4 P	5 P	.02	
16	59.0	.774	64.5	W.	102	2.0	20	12 M				
17	64.0	.702	85.5	W.S.W.	5	6.0	35	9 P	9 P	12 P	.74	
18	67.5	.805	85.0	S.S.W.	126	10.0	44	10 P	1 P	3 P	T	
19	69.0	.794	88.5	S.S.W.	242	6.5	36	12 M	4 A	2 P	T	
20	67.0	.802	84.0	S.W.	100	2.0	20	3 P				
21	67.5	.720	88.0	S.S.W.	85	2.0	20	2 P	12 M	5 P	1.42	
22	69.5	.840	84.5	S.S.W.	44	0.0	—	—				
23	71.5	.851	90.0	S.W.	20	0.0	—	—				
24	68.0	.763	90.5	S.S.W.	35	3.0	24	11 A	5 P	8 P	.06	
25	68.0	.824	84.5	S.E.	27	0.0	—	—				
26	69.0	.860	83.0	S.S.W.	108	2.0	20	8 A				
27	66.5	.841	78.5	W.N.W.	83	2.0	20	11 A				
28	63.0	.812	71.5	N.N.W.	100	1.5	17	10 A				
29	65.0	.754	83.5	S.W.	60	1.0	14	10 A	8 A	4 P	T	
30	73.5	1.190	70.0	W.	101	2.5	22	10 A				
31	71.5	1.197	65.0	N.W.	50	0.5	10	12 M				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during July, while generally normal, presented a few features of more than passing interest. The most noticeable feature was the storm of the 21st instant. While this storm was only moderately severe at the station—its principal feature being the excessive precipitation—in the immediate vicinity it was of exceptional severity. Only a few miles away the wind approached a hurricane in velocity, and hail did much damage to the growing crops, especially tobacco. The precipitation was also much greater than here and caused washouts on the railroads and much damage to the highways. Only an occasional hailstone was noted here.

The other abnormal feature was the excessive heat and high hnmidity of the last two days of the month. Both days were exceedingly oppressive, and the month closed without any immediate change in sight.

The records of the several weather elements showed the following features: The mean barometer was practically normal and the range quite small. The total wind movement was only about sixty per cent of the normal, and an unusual amount was from the southwest quadrant. Only a few moderate gales were noted.

The mean hourly temperature was a degree higher than the normal, and the maximum and minimum temperatures were both about five degrees higher than usual.

The mean dew point and relative humidity were both considerably higher than the normal.

The total precipitation was one inch less than the normal. Nearly the whole amount occurred during the three storms on the 11th, 17th, and 21st. The first and last thirds of the month were practically free from rain.

The amount of sunshine was slightly more than normal.

J. E. OSTRANDER, Meteorologist.

W. P. SAUNDERS, Observer.

BULLETIN No. 344. AUGUST, 1917

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.00, 31st, 12 M	
Minimum reduced to freezing, 29.31, 24th, 3 P	
Reduced† maximum reading, 30.29, 31st, 12 M	
Reduced† minimum reading, 29.59, 24th, 3 P	
Mean semi-daily reduced	30.005
Monthly range	0.70

***Air Temperature.** In Degrees Fahr.

Highest	98.0, 1st, 4 P
Lowest	46.0, 27th, 4 A
Mean hourly	70.9
Mean of means of max. and min.	72.3
Mean sensible (wet bulb)	65.6
Monthly range	52.0
Highest mean daily	83.2, 1st
Lowest mean daily	62.2, 26th
Mean maximum	84.3
Mean minimum	60.4
Mean daily range	23.9
Greatest daily range	39.5, 27th
Least daily range	10.5, 23d

Humidity.

Mean dew point	63.2
Mean force of vapor	.738
Mean relative humidity	80.0

Precipitation. In inches.

Total precipitation, in inches	7.06
Number of days on which .01 inch or more rain fell	13

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	2548 m
Greatest daily movement	251m, 28th
Least daily movement	21m, 13th
Mean daily movement	82.0 m
Mean hourly velocity	3.4 m

Maximum pressure per square foot, 3.5 lbs = 26 m per hour, 2d, 9th, 20th, 28th.

Maximum velocity for 5 minutes 15m per hour, 28th, 2 P, N.E.

Prevailing direction, South Southwest.

Summary.

South Southwest	10 per cent
South	19 " "
North Northwest	16 " "
West	13 " "
Other directions	42 " "

Weather.

Mean cloudiness observed	50 per cent
Total cloudiness recorded by the Sun Thermometer	142 hours = 33 per cent
Number of clear days	12
Number of fair days	16
Number of cloudy days	3

Bright Sunshine.

Number hours recorded, 287 hrs, = 67 per cent.

Rain. 8th, 9th, 10th, 14th, 15th, 16th, 17th, 18th, 21st, 22d, 23d, 24th, 29th, 30th, 31st.

Hail, 21st.

Thunder and Lightning, 9th, 10th, 15th, 17th, 21st, 24th, 29th, 30th.

Gales, 35 or more miles per hour. None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.93	29.83	29.878	98.0	4 P	69.0	5 A	83.5	83.2	74.0	11.0
2	29.88	29.74	29.861	97.0	4 P	72.5	6 A	84.7	80.8	73.5	10.5
3	29.95	29.83	29.918	84.0	5 P	64.0	12 P	74.0	73.1	64.0	10.2
4	30.12	29.95	30 068	82.0	2:30 P	55.0	6 A	68.5	68.8	62.5	13.0
5	30.17	30.08	30.116	86.0	6 P	53.0	5 A	69 5	69.7	63.5	13.0
6	30.09	30.04	30.069	85 5	4 P	56.0	6 A	70.7	72.2	66.3	11.4
7	30.22	30.07	30.166	88.0	4:30 P	64.0	6 A	76.0	74.6	67.0	10.0
8	30.23	30.04	30.144	82.5	2:30 P	59 5	5 A	71.0	70.3	66.7	6.0
9	30.04	29.80	29.865	85.0	3:30 P	69.0	12 P	77.0	75.3	71.5	8.3
10	29.95	29.72	29.850	81.5	5 P	61.0	12 P	71.3	69.7	64.3	10.0
11	30.07	29 95	30.029	85.0	3:30 P	54.5	6 A	69 7	68.8	64.0	12.0
12	30.16	30.07	30.125	88.0	3 P	57.0	6 A	72.5	70.8	64 3	11.8
13	30.20	30.14	30.180	88.5	4:30 P	58.0	6 A	73 3	71.2	65.0	11.3
14	30.19	30.14	30.167	85.0	2 P	61 0	5 A	73 0	71.9	65.7	11.1
15	30.17	30.04	30 083	79.0	1:30 P	65.0	12 P	72.0	69 8	66.3	6.2
16	30.04	29.91	29.969	83.0	2 P	65.0	5 A	74.0	70.7	67.5	7.5
17	29.91	29.78	29 850	80.5	1:30 P	59.0	12 P	69.7	68 9	67 3	6.1
18	29.99	29 83	29.900	80.5	5 P	54.5	6 A	67.5	66.0	62.5	12.0
19	30 06	29.96	30.015	86.0	4 P	53.5	6 A	69.7	67.0	64.0	13.0
20	30.01	29.84	29.954	87 5	3:30 P	63 0	5 A	75.3	73.3	67.5	11.5
21	30.02	29.86	29.931	88.0	3 P	63.0	5 A	75.5	71.3	67.5	8.5
22	30.06	29.99	30.021	75.0	4 P	63.5	5 A	69.3	69.1	64.5	5.7
23	29.99	29.74	29.890	75.0	4 P	64.5	6 A	69.7	70.5	67.5	2.7
24	29.74	29.59	29.638	88.5	1:30 P	70.0	3 A	79.3	76 0	72.3	4.5
25	29.86	29 65	29.740	86.5	4 P	62.0	12 P	74.3	73 7	67.0	10.0
26	30.15	29.86	30.088	77.0	5 P	50.0	6:30 A	63.5	62.2	54 5	12.5
27	30.18	30 09	30.148	85 5	3 P	46.0	4 A	65.7	66.3	59.3	11.0
28	30.09	29.96	30.051	83.5	3 P	62.0	5 A	72.7	72.0	65.0	9.7
29	30.09	29.96	30.074	83.5	2 P	64.0	12 P	73.7	68.9	64 5	6.0
30	30.15	30.00	30.082	78.0	12 M	59.0	12 P	68.5	68.0	66.0	0.0
31	30.29	30.15	30.284	80.5	5 P	54.5	6 A	67.5	65.2	59.0	10.2

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	70.5	1.096	68.5	W.	44	2.0	20	6 P				
2	71.5	.993	78.0	W.	61	3.5	26	5 P				
3	60.5	.750	70.0	N.N.W.	41	0.5	10	1 P				
4	58.0	.720	68 0	N.N.W.	42	0.0	—	—				
5	60.5	.711	74 0	N.N.W.	32	0.0	—	—				
6	63.0	.785	75.0	S.E.	86	1.5	17	3 P				
7	63.0	.855	68.0	S.	64	1.5	17	7 A				
8	65.5	.707	91.5	S.	74	2 5	22	2 P	7 A	8 P	.13	
9	70.0	.844	87.5	S.S.W.	179	3.5	26	6 P	11:30P	12 P	.60	
10	62.0	.868	85.5	N.N.W.	43	1.0	14	1 P	0 A	3 A	2.34	
11	62.0	.682	81 0	N.W.	28	0.0	—	—				
12	61.0	.699	76.0	E.S.E.	25	0 0	—	—				
13	61.5	.718	72.0	N.W.	21	0.5	10	1 P				
14	63.5	.708	80.5	S.S.W.	107	2.0	20	3 P	6:30 A		T	
15	63.5	.714	72.5	S.S.W.	110	2.5	22	3 P	5 P	12 P	.26	
16	66 5	.710	90.5	S.	81	0 5	10	6 P	8 A	8 P	.04	
17	67.0	685	94.0	S.	110	2.0	20	12 M	6 A	8 P	.88	
18	60.5	.640	82.5	N.N.W.	75	1.0	14	5 P	2 A	4 A	.22	
19	60.5	.644	73.0	W.	53	0.5	10	2 P				
20	65.0	.802	77.0	S.	184	3.5	26	4 P				
21	66.0	.730	88.0	W.N.W.	79	0.0	—	—	3 P	12 P	.21	
22	61.5	.717	77.0	E.N.E.	23	0.0	—	—	8 P	12 P	T	
23	66.5	.726	89 0	E.	42	0.0	—	—	8 A	12 P	.03	
24	71.5	.850	90.0	S.	159	2.0	20	1 P	0 A	12 P	.26	
25	64.0	.770	79.5	E.S.E.	84	2.0	20	3 P				
26	51.0	.499	75.0	S.E.	142	2.5	22	9 A				
27	56.0	.611	76 0	E.	63	0.5	10	1 P				
28	61.5	.754	72.5	N.E.	251	3.5	26	2 P				
29	63.0	.663	87.5	N.E.	116	2.5	22	2 P	1 P	10 P	1.80	
30	65.5	.660	96.0	N.	67	2.0	20	11 A	1 A	6 P	.28	
31	56.5	.562	83.0	W.	62	0.0	—	—	0 A	2 A	.01	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during August was marked by an unusual number of thunder storms of more than ordinary severity with heavy precipitation. One of the storms was accompanied by much hail in the immediate vicinity of the station and considerable damage was done to tobacco and fruit. The storm on the night of the 9th and 10th was one of the heaviest downpours here in many years, nearly three inches of rain falling in about three hours. High temperatures were in evidence most of the month, the thermometer registering 80 degrees or more on 26 days. The highest temperature of the month was reached on the 1st during the hot wave which started the latter part of July, and continued the first two days of this month.

Comparing the records with the normals for this station the following features are noted: The barometer record was practically normal in every respect. The total wind movement was considerably less than normal and not a single gale was recorded on the wind-pressure chart. The wind direction was more variable than usual.

The mean temperature was more than three degrees above the normal and the range a little larger than usual. Both the maximum and minimum were several degrees higher that their respective normals. There was no approach to the temperature for frost at any time.

The mean dew point and relative humidity were both several points above their normals.

The total precipitation was about seventy per cent more than the normal.

Notwithstanding the large precipitation the amount of sunshine was considerably more than usual, and only three days were recorded as cloudy.

J. E. OSTRANDER, Meteorologist.

H. B. MILLARD, Acting Observer.

BULLETIN No. 345. SEPTEMBER, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.24, 23d. 8 A
Minimum reduced to freezing,	29.20, 30th, 4 P
Reduced maximum reading,	30.54, 23d, 8 A
Reduced† minimum reading,	29.49, 30th, 4 P
Mean semi-daily reduced	30.107
Monthly range	1.05

***Air Temperature.** In Degrees Fahr.

Highest	85.0, 19th, 3 P
Lowest	30.5, 11th, 6 A. 24th, 5 A
Mean hourly	57.0
Mean of means of max. and min.	58.4
Mean sensible (wet bulb)	52 1
Monthly range	54.5
Highest mean daily	67.9, 2d
Lowest mean daily	45.9, 11th
Mean maximum	72.8
Mean minimum	44.0
Mean daily range	28.8
Greatest daily range	41.0, 19th
Least daily range	6.5, 1st

Humidity.

Mean dew point	49.7
Mean force of vapor	.436
Mean relative humidity	83.5

Precipitation. In inches.

Total precipitation, in inches	2.42
Total snow, in inces	
Number of days on which .01 inch or more rain fell	5
Days of sleighing,	

Wind.

Total movement	1702 m
Greatest daily movement	179m, 10th
Least daily movement	1m, 26th
Mean daily movement	57.0 m
Mean hourly velocity	2.4 m

Maximum pressure per square foot, 3.5 lbs = 26 m per hour, 6th, 7 A, N.

Maximum velocity for 5 minutes 16m per hour, 6th, 7 A, N.

Prevailing direction, East.

Summary.

East	20 per cent
Southwest	13 " "
Northeast	10 " "
North	10 " "
Other directions	47 " "

Weather.

Mean cloudiness observed	39 per cent
Total cloudiness recorded by the Sun Thermometer	133 hours = 36 per cent
Number of clear days	13
Number of fair days	11
Number of cloudy days	6

Bright Sunshine.

Number hours recorded, 240 hrs, = 64 per cent.

Rain, 1st, 2d 8th, 20th, 21st, 28th, 30th.

Thunder and Lightning, 1st, 2d, 20th, 30th

Frosts, 11th, 12th, 23d, 24th.

Gales, 35 or more miles per hour. None.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine.
	Maximum	Minimum.	Mean. Semi-daily.	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.31	30.20	30.261	61.0	1 P	54.5	6 A	57.7	58.6	57.5	0.0
2	30.20	29.96	30 050	82.5	3 P	58.5	4 A	70.5	67.9	64.7	8.3
3	30.03	29.96	30.023	78.0	1 P	57.0	12 P	67.5	67.0	60.0	11.0
4	30.18	30.03	30.103	72 5	2:30 P	51.0	12 P	61.7	61.2	55.0	9.7
5	30.24	30.06	30.161	73.5	2:30 P	43 0	6 A	58.3	56.3	50 5	11.5
6	30.06	29.74	29.861	72.0	4 P	46.0	0 A	59.0	59.3	56.0	2.3
7	30.13	29.92	30.101	73.0	3:30 P	42.0	6 A	57.5	56.0	48.5	11.4
8	30.17	30.11	30.156	65.5	5 P	45.0	12 P	55 3	52.7	49.0	7.3
9	30.14	29.94	30.054	71.0	3 P	43.5	5 A	57.3	55.2	50.0	7.5
10	30.17	29 94	30.114	61.0	4 P	36.0	12 P	48.5	50.4	42 3	8.0
11	30.23	30.13	30.222	63.0	2:30 P	30.5	6 A	46.7	45.9	41.5	10.6
12	30.31	30.21	30 273	74 5	4 P	34.0	6:30 A	54.3	53.0	46.0	11.7
13	30.31	30.24	30.293	80.0	3 P	39.5	6 A	59.7	57.0	49.7	10.9
14	30.33	30 24	30.319	82.0	3 P	42.0	6 A	62.0	59.2	51 3	10.5
15	30.37	30.32	30.338	75.0	2 P	44.0	6 A	59.5	58.9	54.5	9.5
16	30.39	30 33	30.359	64.0	1:30 P	46.0	12 P	55.0	56.1	53.5	4.0
17	30.33	30.00	30.165	70.0	2:30 P	41 0	5 A	55.5	55.4	52.7	7.9
18	30.00	29.81	29 908	81.0	3 P	50.5	4:30 A	65.7	62 6	55.3	9.8
19	29.95	29.83	29.917	85.0	3 P	44.0	6 A	64 5	62.7	56.3	10.5
20	29.89	29.82	29.876	81.0	1:30 P	52.5	6:30 A	66.7	64.6	59 5	6.8
21	29.97	29 84	29.903	76.0	4 P	48 0	12 P	62.0	61.3	52.0	8.0
22	30.41	29.97	30.194	65.0	4 P	40.0	12 P	52.5	50.6	47.3	11.0
23	30 54	30.41	30.519	68.5	2 P	32.0	6 A	50.3	48.1	43.5	11.1
24	30.52	30 30	30.403	68.5	2 P	30.5	5 A	49 5	48.9	45.5	9 5
25	30.30	30.13	30.197	76.0	3 P	47.0	12 P	61.5	57.8	51.0	0.0
26	30.18	30.09	30.137	79.0	3 P	42.5	5 A	60.7	54.9	51.3	8.3
27	30.13	29.93	30.046	79.0	3 P	45.0	5 A	62.0	59.5	55.0	8.0
28	29.93	29 76	29.833	69 5	2 P	48.0	12 P	58.7	59.5	58.5	2.1
29	29 89	29.70	29.833	69 5	2 P	43 5	6 A	56.5	56 5	53.0	10.0
30	29.70	29 49	29.599	67.0	3 P	43.5	6 A	55.3	51.5	50.0	2.9

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	56.5	.504	90.5	N.N.W.	42	0.0	—	—	10 A	2 P	.22	
2	64.0	.653	92.5	N.	67	1.0	14	1 P	7 P	8 P	.46	
3	55.5	.630	67.5	S.S.E.	42	0.0	—	—				
4	51.5	.508	75.0	S.	106	1.0	14	10 A				
5	48.0	.394	87.0	S.S.W.	58	0.5	10	8 A				
6	52.5	.531	75.0	E.	130	3.5	26	7 A				
7	44.5	.396	75.0	S.W.	31	0.0	—	—				
8	47.5	.359	90.0	N.W.	37	0.0	—	—	2 A	9:30 A		
9	51.0	.385	90.5	N.E.	45	1.0	14	12 M				
10	37.5	.311	73.5	W.S.W.	179	2.5	22	10 A				
11	39.0	.287	84 0	S.W.	37	1.0	14	1 P				
12	44.5	.342	87.0	E.	34	0.5	10	12 M				
13	47.0	.378	87.5	E.	18	0.0	—	—				
14	48 5	.438	81.5	E.N.E.	24	0.0	—	—				
15	51.5	.485	80 0	S.W.	49	0.5	10	12 M				
16	51.5	.451	84.0	S.	68	0.0	—	—				
17	52.5	.415	95.5	S.S.E.	42	0.5	10	9 A				
18	52 5	.484	83.5	E.S.E.	103	2.0	20	12 M				
19	53.0	.530	79.5	N.N.E.	15	0.5	10	2 P				
20	58.5	.531	93 0	N.	45	0.5	10	2 P	2:30 P		T	
21	49 0	.475	83 0	E.	54	1.0	14	1 P	8:30 A	9 A	T	
22	44 5	.352	81.5	S.W.	106	2.0	20	10 A				
23	38.5	.320	69.5	S.E.	39	0.5	10	7 P				
24	43 5	.332	87.5	N.E.	7	0.0	—	—				
25	49.0	.401	87.0	E.S.E.	19	0.0	—	—				
26	49.5	.387	89.0	E.N.E.	1	0.0	—	—				
27	54.0	.463	91.0	N.E.	35	1.0	14	11 P				
28	57.0	.515	87.5	E.	163	1.5	17	3 A	2 A	9 A	.28	
29	49 0	.440	74.5	N.	75	1.5	17	2 P				
30	48.5	.373	92.0	E.	31	2.5	22	4 P	9:30 A	7:30 P	.74	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during September while generally pleasant was considerably cooler than usual, and the precipitation was comparatively light. While the first frost was about a week earlier than the average date for this locality, it was much more severe than the ordinary first frost of a season, and the resulting damage caused, especially to corn on account of the generally backward condition of growth, was much greater than is usually the case. Other crops were damaged to some extent, but the loss was much less than that of the corn. A comparatively small wind movement with many calm periods caused an unusually abnormal wind direction and a much varied record of daily prevailing directions. The precipitation record showed a period of nearly three weeks without a measurable amount of rain.

The records of the several weather elements compared with their respective normals show the following features of more or less interest: The mean barometer was higher than the normal and the range considerably more than usual. During much of the period of high barometer the wind movement was very small, resulting in a total wind movemeat of but little more than one-half the usual amount.

The mean hourly temperature was more than four degrees lower than the normal, and the maximum and minimum were both about two degrees lower than their normals.

The mean dew point was about four degrees lower than usual, and the relative humidity considerably higher than the average value.

The total precipitation was about sixty per cent. of the normal and nearly all of it occurred during three showers of moderate intensity.

The amount of sunshine was considerably more than normal, and only six cloudy days were noted.

J. E. OSTRANDER, Meteorologist.

H. B. MILLARD, Acting Observer.

BULLETIN No. 346. OCTOBER, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.10, 18th. 9 A
Minimum reduced to freezing, . 28.98, 30th, 4 P
Reduced maximum reading, . . 30.40, 18th, 9A; 23d, 8 A.
Reduced† minimum reading, . 2 .29, 30th, 4 P
Mean semi-daily reduced 30.052
Monthly range 1.11

***Air Temperature.** In Degrees Fahr.

Highest . . . . . 70.0, 27th, 3 P
Lowest . . . . . 27.0, 21st, 6 A
Mean hourly 47.0
Mean of means of max. and min. 47.4
Mean sensible (wet bulb) 43.5
Monthly range 43.0
Highest mean daily 60.1, 19th
Lowest mean daily 37.7, 31st
Mean maximum 57.9
Mean minimum 36.8
Mean daily range 21.1
Greatest daily range 31.5. 2d, 3d
Least daily range 5.5, 24th

Humidity.

Mean dew point 40.0
Mean force of vapor 317
Mean relative humidity 79.6

Precipitation. In inches.

Total precipitation, in inches 6.60
Total snow, in inces . . . . . .
Number of days on which .01 inch or more rain fell 12
Days of sleighing, . . .

Wind.

Total movement . . . . . 4118 m
Greatest daily movement 469m, 30th
Least daily movement 23m, 17th
Mean daily movement . . . . . 133.0 m
Mean hourly velocity . . . . . 5.5 m
Maximum pressure per square foot, 17.0 lbs = 58 m per hour, 30th, 9 A, S.W.
Maximum velocity for 5 minutes 36m per hour, 30th, 10 A, S.W.
Prevailing direction, South Southwest.

Summary.

South . . . . . 19 per cent
South Southwest . . . . . 19 " "
Southwest . . . . . 13 " "
Southeast . . . . . 10 " "
Northeast . . . . . 10 " "
Other directions . . . . . 28 " "

Weather.

Mean cloudiness observed . . . . 55 per cent
Total cloudiness recorded by the Sun Thermometer . . 205 hours = 59 per cent
Number of clear days 10
Number of fair days 5
Number of cloudy days 16

Bright Sunshine.

Number hours recorded, 142 hrs, = 41 per cent.

Rain, 5th, 8th, 9th. 10th, 12th. 15th, 19th, 20th, 24th, 27th, 28th, 30th.

Thunder and Lightning, 5th, 15th, 27th.

Frosts, 7th, 13th. 17th, 21st, 23d, 29th, 31st.

Gales, 35 or more miles per hour. 41m, 19th, S.; 51m, 24th, S.; 44m, 28th. S.W.; 38m, 30th, S.W.

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.04	29.59	29.823	60.0	3 P	42.0	12 P	51.0	50.9	47.3	3.3
2	30.26	30.04	30.246	67.0	3 P	35.5	6 A	51.3	50.2	48.5	6.5
3	30.23	29.91	30.086	69.0	3 P	37 5	5 A	53.3	52.7	49.0	8.0
4	29.91	29.62	29 773	65.0	1 P	42.0	12 P	53.5	53.8	48.7	1.8
5	29.94	29.86	29.900	53.0	2 P	37.0	2 A	45.0	46.4	46.3	0.6
6	30.18	29 91	30 030	60.0	3:30 P	41 0	12 P	50.5	50.1	46.5	6.7
7	30.28	30.18	30.244	61.0	4 P	31.5	7 A	46.3	46.2	43.3	9.4
8	30.18	30 00	30.093	58.5	2 P	39.0	6:30 A	48.8	49.2	45.5	3.9
9	30.20	30.10	30.193	46.0	1 P	39 0	12 P	42.5	42.1	40.3	0.2
10	30.14	30.11	30 134	46 5	4 P	39 0	2 A	42.8	42.4	41.3	0.7
11	30.14	30.00	30.060	46.5	4 P	32.0	12 P	39.8	41.0	39.8	0.1
12	30.07	29.67	29.926	57.0	3:30 P	29 5	1 A	43.3	43.0	41.0	1.2
13	30.10	29 78	29.981	55 5	2 P	32.0	6:30 A	43.8	44.2	40.0	6.7
14	30.19	30 03	30 119	60.0	3 P	34 5	7 A	47.3	46.7	40.0	9.5
15	30.03	29.74	29.839	63.5	12 M	46.0	3 A	54.7	51.7	50.0	1.7
16	30.18	29.84	30.038	63.0	2 P	39 0	12 P	51.0	50.9	44.7	9.8
17	30.38	30.18	30.337	61.0	4 P	30 5	5 A	45.7	43.7	38.0	10.0
18	30.40	30.24	30 337	62.0	2 P	41.0	2 A	51.5	49.5	46.0	2.8
19	30 24	29.80	29.979	69.0	3 P	47.0	12 P	58.0	60.1	60.3	1.9
20	30.20	29.88	30.093	50.0	1 P	33.0	12 P	41.5	43.3	37 5	1.1
21	30.30	30.07	30.215	55.5	4 P	27.0	6 A	41.3	41.0	34.7	9.5
22	30.25	30.01	30.109	57.5	2:30 P	36.0	6 A	47.7	45.2	38.7	9.5
23	30.40	30 25	30 372	57.0	4 P	28.5	7 A	42.7	42.1	38.0	8.8
24	30.29	29.54	29.881	46 5	8 P	41.0	12 P	43.7	43.7	45.0	0.0
25	29.99	29.61	29.857	51.0	2 P	41.5	7 A	46.3	44.0	40.5	3.5
26	30.15	29.99	30.110	61.5	3 P	37.5	7 A	49.5	47.8	41.5	9.1
27	30.08	29.83	30.015	70.0	3 P	44.5	0 A	56.7	55.7	52.3	7.0
28	30.22	29 74	30.108	56.0	0 A	38.0	12 P	47.0	48.8	40.3	8.7
29	30.22	29 77	30.060	54.5	9 P	28.5	6 A	41.5	43.2	41.3	1.0
30	29 79	29 29	29.565	66.0	12 M	39.5	12 P	52.7	50.2	50.0	0.0
31	30.11	29.79	30.078	47.5	2 P	32.0	6 A	39.7	37.7	33.7	8.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	43.5	.357	77.0	W.N.W.	98	2.0	20	3 P				
2	46.0	.374	86 5	S.W.	30	0.0	—	—				
3	47.0	.362	84 0	S.S.W.	142	4.0	28	2 P				
4	45 5	.378	84.5	S.S.W.	196	3.0	24	9 A				
5	44.5	.318	89.5	N W.	33	0.0	—	—	8 A	10 P	.35	
6	44.5	.338	87.5	N.N.W.	75	1.5	17	2 P				
7	40.5	.296	80.5	S.	73	1.5	17	5 P				
8	42.0	.292	78.0	S.S.W.	144	3.5	26	2 P	6 P	8 P	.15	
9	37.5	.263	82.5	N.E.	101	2.0	20	9 A	3 P	10:30P	.09	
10	35.5	.282	66.5	E.N.E.	87	1.0	14	8 A	9:30 P	11 P	.01	
11	38 5	.244	92.0	N.E.	64	0.5	10	3 P				
12	39.5	.270	91.5	N.E.	103	5 5	33	6 P	3 P	11 P	.78	
13	35.0	.284	69.5	S.W.	110	2 0	20	2 P				
14	35.5	.292	69.5	S.S.W.	85	2.0	20	12 P				
15	47 0	.388	81.5	S S.W.	247	5.5	33	12 M	12:30 P	4 P	.15	
16	39.5	.338	71.0	W.N.W.	133	5.5	33	3 P				
17	35.0	.248	81.0	S.W.	23	0.0	—	—				
18	42.5	.337	78.5	S.	81	2.5	22	6 P				
19	59 0	.556	89.5	S.	243	8.5	41	12 M	2 P	12 P	.05	
20	34.0	.245	80 0	S.E.	164	1.5	17	4 A	0 A	9 A	.38	
21	28.5	.232	67.0	S.	47	1.0	14	2 P				
22	33.5	.269	71.5	S.E.	78	1.5	17	3 P				
23	33 5	.263	74.5	S.E.	44	1.0	14	7 P				
24	44.0	.304	94.0	S.	224	13.0	51	5 P	8 A	11:30P	1.01	
25	37.5	.274	83 0	N.	236	2.5	22	8 A				
26	38.0	.305	79.5	N.	121	1.5	17	6 P				
27	51.0	.422	89.5	S.	128	3.5	26	12 P	8:30 P	12 P	.85	
28	31.0	.316	58.0	S.W.	295	9.5	44	1 A	0 A	1 A	.05	
29	35 0	.314	68 5	W.S.W.	78	3.0	24	3 P				
30	48.0	.445	84.5	S.S.W.	469	17.0	58	9 A	0 A	7 P	2.73	
31	29.5	.214	77.5	W.	166	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during October was less pleasant than usual, owing to the large number of cloudy days and comparatively cool temperature. The precipitation record was also unusually large, which added to the general discomfort. The rainstorm on the 30th was unusually heavy for this locality and was accompanied by a very high wind and low barometer.

A comparison of the records of the several weather elements with their normals for this station shows the following as the more important features: The mean barometer was practically normal while the maximum and minimum records were both considerably lower than their normals. The range of pressure was about the usual amount. The total wind movement was nearly the normal amount, but the prevailing direction was much nearer the south point than usual.

The mean temperature was about three degrees lower than normal and the maximum was nine degrees lower than usual, and came unusually late in the month. The minimum temperature was nearly four degrees higher than usual, giving an unusually small range. Several frosts were noted, but, owing to the killing frost which occurred in September, they did no especial damage.

The mean dew point was slightly lower than usual and the relative humidity comparatively high.

The total precipitation was about three inches more than the average value for October—the storm of the 30th furnishing nearly all of this surplus.

The amount of sunshine was less than 80 per cent of the normal amount.

J. E. OSTRANDER, Meteorologist.

H. B. MILLARD, Observer.

BULLETIN No. 347. NOVEMBER, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.25, 4th. 8 P
Minimum reduced to freezing,	29.15, 22d, 11 P
Reduced maximum reading,	30.54, 4th, 8 P
Reduced† minimum reading,	29.46, 22d, 11 P
Mean semi-daily reduced	30.065
Monthly range	1.08

***Air Temperature.** In Degrees Fahr.

Highest	62.0, 6th, 2 P
Lowest	7.0, 29th, 7 A
Mean hourly	33.3
Mean of means of max. and min.	34.6
Mean sensible (wet bulb)	28.4
Monthly range	55.0
Highest mean daily	41.7, 6th
Lowest mean daily	16.4, 27th
Mean maximum	45.5
Mean minimum	23.6
Mean daily range	21.9
Greatest daily range	38.0, 6th, 15th
Least daily range	7.0, 22d

Humidity.

Mean dew point	22.2
Mean force of vapor	.180
Mean relative humidity	71.1

Precipitation. In inches.

Total precipitation, in inches	0.63
Total snow, in inches	1
Number of days on which .01 inch or more rain fell	4
Days of sleighing,	

Wind.

Total movement	3721 m
Greatest daily movement	356m, 25th
Least daily movement	1m, 30th
Mean daily movement	124.0 m
Mean hourly velocity	5.2 m

Maximum pressure per square foot, 6.5 lbs = 36m per hour, 25th, 6 A, W.N.W.; 26th, 9A, N.N.W.

Maximum velocity for 5 minutes 24m per hour, 26th, 9 A, N.N.W.

Prevailing direction, Northwest.

Summary.

North Northwest	27 per cent
North	17 " "
West	17 " "
Northwest	13 " "
Other directions	26 " "

Weather.

Mean cloudiness observed	34 per cent
Total cloudiness recorded by the Sun Thermometer	123 hours = 42 per cent
Number of clear days	12
Number of fair days	9
Number of cloudy days	9

Bright Sunshine.

Number hours recorded, 170 hrs, = 58 per cent.

Rain, 21st, 22d, 23d, 24th.

Snow, 24th, 28th.

Gales, 35 or more miles per hour. 36m, 25th W.N.W.; 36m, 26th, N.N.W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.24	30.09	30.227	49.0	3:30 P	25.5	7 A	36.3	35.4	26.5	8.0
2	30.28	30.18	30.263	48.0	2:30 P	27.0	6:30 A	37.5	34.9	30.0	8.2
3	30.31	30.05	30.200	44 5	3 P	25.5	3 A	35.0	34.0	30.5	1.7
4	30.54	30.31	30.513	44.5	3 P	29.5	12 P	37.0	35 9	30.0	8.3
5	30.48	30.16	30.345	55.0	3:30 P	25.0	6:30 A	40.0	38.4	32.0	9.3
6	30.16	29.87	30 013	62.0	2 P	24.0	6:30 A	43.0	41.7	34.0	7.3
7	30.17	29 98	30.113	43.0	2 P	30.0	12 P	36.5	34.6	29.7	8.0
8	30.17	30.02	30.098	45 0	2 P	23.0	5 A	34.0	35.1	32.5	6.7
9	30.05	29.84	29.983	52.0	2:30 P	30.5	7-30 A	41.3	40.5	33.7	8.0
10	30.01	29.75	29.905	56.0	3 P	30 5	7 A	43.3	41.6	36.5	8.9
11	30.13	29 94	30.080	56.0	3 P	24 0	7:30 A	40.0	36.7	31.0	3.8
12	30.22	29.87	30.054	49.0	10 A	24.0	12 P	36.5	36.1	29.0	7.7
13	30.38	30.15	30.285	49.0	4:30 P	18.5	6:30 A	33.7	31.3	23.7	8.0
14	30.19	30.01	30.138	56 5	3:30 P	22.5	7:30 A	39.5	33.8	26.0	6.9
15	30.01	29.78	29.897	61.5	1:30 P	23.5	2:30 A	42.5	38.1	30.3	8.0
16	29.89	29.79	29.862	46.0	10 A	29 0	12 P	37.5	38.9	33.3	4.0
17	29.97	29.79	29.971	54.0	1:30 P	22.0	7 A	38.0	35.9	32.0	7.0
18	29.95	29.67	29.837	61.0	2:30 P	27.5	6 A	44.3	41.0	36.0	7.0
19	30.12	29.80	30.104	40.0	0 A	25 0	9 P	32.5	30.9	25.5	7.0
20	30.10	29.77	29.906	48.5	2:30 P	28.0	7 A	38.3	35.9	30.7	0.7
21	29.77	29.71	29.681	43.0	3 P	35.5	7 A	39.3	38.5	35.2	0.0
22	29.71	29.46	29.539	44.0	8 P	37.0	9 A	40.5	38.9	39.7	0.0
23	29.62	29.47	29.597	43.0	2:30 P	33.0	7:30 A	38.0	38.6	36.7	0.0
24	29 82	29.55	29.712	34.5	12 M	18.0	0 A	26.3	31.8	28.7	0.0
25	30.19	29.82	30.070	30.5	2 P	17.5	8:30 A	24.0	22.0	16.7	8.0
26	30.49	30.19	30 394	27.5	2 P	13.0	12 P	20.3	20.6	17.3	8.0
27	30.51	30 43	30.487	27.5	3:30 P	10.5	7:30 A	19.0	16.4	10.7	8.4
28	30.43	30.07	30.170	25.5	6 P	12.0	12 P	19.7	18.0	16.0	0.0
29	30.32	30.15	30.312	39.5	3 P	7.0	7 A	23.3	22.2	15.5	7.7
30	30.32	29.81	30.205	31.0	12 P	11.5	7A	21.3	23.6	22.3	1.3

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	16.0	.170	56.0	W.	19	0.0	—	—				
2	23.0	.175	72.0	N.W.	66	1.0	14	4 P				
3	26.0	.186	79.5	W.	158	3.5	26	3 P				
4	20.5	.205	54 0	N.	272	4.0	28	11 A				
5	26.5	.211	70.0	N.	63	2.5	22	9 A				
6	26.5	.244	62.0	W.S.W.	84	4.0	28	9 P				
7	24.0	.180	73.0	N.	292	5.0	32	10 A				
8	27.0	.212	69.0	N.N.W.	218	3.5	26	11 A				
9	28 0	.220	69.5	N.N.W.	122	3.0	24	3 P				
10	31.0	.252	68.5	S.S.W.	180	3.5	26	12 M				
11	26.5	.140	79.5	E.	14	0.0	—	—				
12	23.5	.177	74.0	N.W.	131	2.5	22	3 P				
13	16.5	.148	67.0	W.	12	0.0	—	—				
14	17.0	.162	64.5	W.	4	0.0	—	—				
15	20.5	.203	61.0	W.	46	1.5	17	6 P	*			
16	27.0	.220	67.5	N.N.W.	256	4.0	28	1 P				
17	29.0	.175	85.5	N.W.	85	1.5	17	1 P				
18	30.0	.253	71.5	S.	60	4.0	28	6 A				
19	20.0	.157	74.5	N.W.	278	2.0	20	9 A				
20	24.0	.198	69.5	S.	163	2.5	22	2 P				
21	32.0	.224	81.0	S.E.	30	0.0	—	—	10 P	12 P	.05	
22	38.0	.257	89 5	E.S.E.	60	0.5	10	9 A	0 A	12 P	.54	
23	35 0	.227	91.5	N.N.E.	96	0.0	—	—	0 A	3 P	.02	
24	24.0	.174	77.0	N.N.W.	161	2.0	20	3 P	7 A	3 P	T	T
25	9.5	.105	67.5	N.N.W.	356	6.5	36	6 A				
26	9.5	.109	64.5	N.N.W.	290	6.5	36	9 A				
27	2.5	.080	63.5	N.	167	4.0	28	12 M				
28	10 0	.100	73.0	N.N.W.	8	0.0	—	—	3:30A	11:30A	.02	*
29	3 5	.107	53 0	N.	29	0.0	—	—				
30	19.0	.131	83.5	N.N.W.	1	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during November was characterized by the large amount of sunshine and small precipitation. During the first three weeks of the month not a trace of rain was noted and the remainder of the month had only one storm of any consequence. Notwithstanding the large amount of sunshine, the weather was considerably colder than usual and the last week was good winter weather. Some days showed unusually low mean temperatures for so early in the winter season.

The record of the several weather elements shows the following as the principal features: The mean barometer was higher than the normal and the range less than usual. The minimum pressure was considerably higher than the normal for this feature. During the last few days of the month a period of high pressure with considerable wind from the north points was concurrent with the low temperature. The total wind movement was, however, considerably less than normal and only two gales were noted.

The mean temperature was more than three degrees lower than usual, and the minimum for the month was more than six degrees below the normal for this feature, giving a comparatively large range.

The mean dew point and relative humidity were both several points below their normals. The total precipitation was only about one-fifth of the usual amount. A light fall of snow occurred near the end of the month. At the close of the month small ponds were frozen over and safe for skating.

J. E. OSTRANDER, Meteorologist.

T. H. REUMAN, Observer.

BULLETIN No. 348. DECEMBER, 1917

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.53, 17th, 10 A
Minimum reduced to freezing,	28.89, 9th, 2 A
Reduced maximum reading,	30.86, 17th, 10 A
Reduced† minimum reading,	29.20, 9th, 2 A
Mean semi-daily reduced	30.222
Monthly range	1.66

***Air Temperature.** In Degrees Fahr.

Highest	40 5, 5th, 3:30 P
Lowest	−22.5, 30th, 7:30 A
Mean hourly	16.9
Mean of means of max. and min.	17.1
Mean sensible (wet bulb)	14.?
Monthly range	63.0
Highest mean daily	33.3, 1st
Lowest mean daily	−12.7, 30th
Mean maximum	26.5
Mean minimum	7.7
Mean daily range	18.8
Greatest daily range	29.0, 22d
Least daily range	5.0, 20th

Humidity.

Mean dew point	9.3
Mean force of vapor	.104
Mean relative humidity	76.9

Precipitation. In inches.

Total precipitation, in inches	2.56
Total snow, in inches	14¼
Number of days on which .01 inch or more rain fell	5
Days of sleighing,	31

Wind.

Total movement	4897 m
Greatest daily movement	438m, 2d
Least daily movement	5m, 16th
Mean daily movement	158.0 m
Mean hourly velocity	6.6 m

Maximum pressure per square foot, 9.0 lbs = 43m per hour, 14th, 4 P, W.N.W.

Maximum velocity for 5 minutes 24m per hour, 14th, 4 P, W.N.W.

Prevailing direction, West Northwest.

Summary.

North	42 per cent
North Northwest	13 " "
South Southwest	13 " "
Northwest	10 " "
West	10 " "
Other directions	12 " "

Weather.

Mean cloudiness observed	46 per cent
Total cloudiness recorded by the Sun Thermometer	147 hours = 45 per cent
Number of clear days	9
Number of fair days	10
Number of cloudy days	12

Bright Sunshine.

Number hours recorded, 156 hrs, = 55 per cent.

Rain. 1st, 24th.

Snow. 1st, 8th, 10th, 13th, 14th, 28th.

Gales. 35 or more miles per hour. 35m, 2d, N.N.W.; 40m, 9th, W.N.W.; 36m, 10th, W.N.W.; 43m, 14th, W.N.W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30 01	29.63	29.692	37.0	9 P	29 0	10 A	33.0	33.3	34 3	0.0
2	29 93	29.62	29.710	37.0	0 A	23.0	12 P	30.0	29.0	25.3	6.5
3	29.95	29 87	29.908	38 5	2:30 P	18.5	7 A	28.5	25 8	22 5	8.0
4	29.97	29.86	29 902	32 5	3 P	17.0	7 A	24.7	24.5	22.3	1.7
5	30.00	29 90	29.944	40 5	3:30 P	18 0	5 A	29.3	26.8	23.5	6.5
6	30.11	30.00	30.090	32.0	3 P	18.0	12 P	25.0	24.3	20 3	7.6
7	30.28	30.03	30 139	27.5	3 P	10.5	12 P	19.0	16 7	12 3	7.9
8	30.28	29.23	29.901	31.0	10:30 P	2.5	7:30 P	16 3	15.0	15.5	1.2
9	29.90	29.20	29 633	34.5	4 A	11.5	8 P	22.5	21 6	17.3	6.9
10	30.18	29.82	29.945	14 5	3:30 P	5.5	7:30 P	10.0	10.9	9 5	7.0
11	30.55	30 18	30.440	20.0	3 P	2.5	2 A	11.3	9.7	7.5	8 0
12	30.61	30 49	30 555	18.0	4 P	−1 5	7:30 A	9.7	5.3	2 5	6.7
13	30.49	30 03	30.267	25.5	9 P	1.0	0 A	13.3	13.8	14.3	5.7
14	30.03	29.23	29 560	31.0	1 P	17.0	12 P	24 0	24.5	22 0	5.1
15	30.58	29 89	30.325	24.0	2 P	−2.0	12 P	11.0	13.9	9.0	6 8
16	30.82	30 58	30 798	13.0	4 P	−13 0	7:30 A	0 0	2.2	−1.0	6.5
17	30.86	30.82	30.828	26.0	3 P	8 0	10:30 P	17 0	13.2	11.5	7.7
18	30.79	30.56	30 669	27.5	7 P	9.0	0 A	18.3	18.6	18.3	3.0
19	30.56	30 36	30 440	33.0	3 P	23 0	6 A	28.0	27 5	26.3	3 8
20	30.36	30.25	30 294	34.5	3:30 P	29.5	0 A	32.0	31.8	30.5	0.0
21	30.25	30.04	30 104	34.5	4 P	28 0	7:30 P	31.3	32 3	31.0	0.0
22	30.34	30 03	30.214	37.0	2 P	8.0	12 P	22.5	26 9	24.0	7.3
23	30.42	30.28	30.338	25.0	2:30 P	−2.0	7 A	11.5	9 4	5.0	7.5
24	30.28	29.95	30.068	37.0	7:30 P	13.0	0 A	25.0	31.7	29 5	0.4
25	30.40	29.95	30 217	39 5	6 A	20.0	12 P	29.7	31.1	26 3	2.3
26	30.63	30.40	30 593	26.0	2:30 P	2.5	12 P	14.3	14.3	8 0	7.5
27	30.76	30 50	30.670	11.5	3 P	−6.5	7:30 A	2.5	2 5	−1.7	7 0
28	30.50	30.11	30.256	25 5	1:30 P	1.0	0 A	13.3	12.3	10.3	0.0
29	30.47	30.35	30.461	2.0	0 A	−14.5	12 P	−6.3	−6.1	−9 3	2.2
30	30.58	30.44	30.544	1.5	2:30 P	−22.5	7:30 A	−10.5	−12.7	−16.5	8.2
31	30.46	30 27	30.370	5.0	3:30 P	−15.5	7:30 A	−5.3	−6 9	−9.3	7.2

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	31.0	.199	86.5	N N.W.	112	3.0	24	9 P	0 A	5 P	1.10	2¼
2	21.0	.148	80.0	N.N.W.	438	6.0	35	6 P				
3	19.5	.129	83 5	N.	152	3.0	24	8 A				
4	17.5	.132	77 5	N.N.W.	18	0 5	10	1 P				
5	20 0	.140	80.5	S.S.W.	29	0 0	—	—				
6	16.0	.120	76.5	N.	62	2 5	22	12 P				
7	6.0	.084	71.5	N.N.E.	203	3.0	24	9 A				
8	8 5	.105	73.5	N.	62	5.5	33	7 P	3:30 P	11:30 P	.28	3¼
9	13 0	.108	78.5	W.	295	8 0	40	8 A				
10	7.5	.072	90.5	W.N W.	261	6.5	36	1 P	5 P	6 P	T	T
11	1.5	.067	72.5	W.	148	5 0	32	11 A				
12	3.0	.053	80.0	N.	8	0.0	—	—				
13	11 5	.095	86.5	N.	26	2.5	22	11 P	5 A	12 P	.38	2
14	19 5	.124	86.5	N W.	337	9 0	43	4 P	0 A	7:30A	.75	6
15	5 0	.073	79.5	N.W.	247	5 0	32	9 A				
16	−7.0	.050	72 5	N.	5	1 0	14	11 P				
17	7.0	078	80.0	N.	120	4.0	28	2 P				
18	14.5	.108	83.0	N.	183	1.5	17	10 P				
19	23.0	.150	86.0	N.N.E.	30	1.0	14	10 P				
20	28.0	.178	87.0	S.S.W.	86	1.0	14	11 A				
21	29 5	.176	95.0	S.S.W.	70	0.0	—	—				
22	17.5	.149	70.5	N.	198	2 5	22	11 A				
23	−5 0	.062	62.5	S S.W.	16	0.0	—	—				
24	27.5	.176	82 0	S.	185	4.0	28	2 P	11 A	8 P	T	
25	19.5	.167	66.5	N.W.	260	3 5	26	8 A				
26	−1.5	.071	60.5	N.	145	2.5	22	1 P				
27	−8.5	.044	69 0	N.N.W.	85	2 0	20	1 A				
28	4 5	.077	76 0	W.	129	5.0	32	3 P	7 A	2 P	.05	¼
29	−18 5	.031	59 0	N.	341	4 5	30	3 A				
30	−26.0	.019	63 0	N.	283	4.5	30	12 M				
31	−16.5	.031	67.0	N.	363	5.0	32	12 M				

**Rain or melted snow at base of tower. *Included in following day.

Annual Summary for 1917.

Pressure. In inches.

Maximum reduced to freezing, ... 30.53, Dec. 17th, 10 A.
Minimum reduced to freezing. . . . . 28.61, Feb. 5th, 11 A.
Maximum reduced to freezing and sea-level, ... 30.86, Dec. 17th, 10A.
Minimum reduced to freezing and sea-level, ... 28.93, Feb. 5th, 11 A.
Mean reduced to freezing and sea-level, ... 30.010
Annual range, ... 1.93

***Air Temperature.** In degrees Fahr.

Highest, ... 98.5, July 31st, 5 P.
Lowest, ... —22.5, Dec. 30th, 7:30 A.
Mean hourly, ... 44.4
Mean of means of max. and min., ... 44.8
Mean sensible (wet bulb), ... 40.2
Annual range, ... 121.0
Highest mean daily, ... 86.4, July 31
Lowest mean daily, ... —12.7, Dec. 30
Mean maximum, ... 55.2
Mean minimum, ... 34.6
Mean daily range, ... 20.6
Greatest daily range, ... 43.0, Mar. 7
Least daily range, ... 3.0, Jan. 5

Humidity.

Mean dew point, ... 36.4
Mean force of vapor, ...352
Mean relative humidity, ... 78.1

Wind.

Prevailing direction, ... West.

Summary.

Total movement, ... 44,653 m
Greatest daily movement, ... 611m., April 11
Least daily movement, . 1 m., Sept. 26; Nov. 30
Mean daily movement, ... 122 m
Mean hourly velocity, ... 5.1 m
Maximum pressure per square foot, 35.0 lbs.=84 m. per hour, April 10, 3 P., N.W.
Maximum velocity for 5 minutes, 40 m. per hour, Apr. 10th, 3 P., N.W.
North Northwest, ... 10 per cent
West Northwest . . . . . 10 " "
West, ... 10 " "
Northwest . . . . . 10 " "
Other directions, ... 59 " "

Precipitation. In inches.

Total precipitation, rain or melted snow, . 43.56
Number of days on which .01 or more rain or melted snow fell, ... 117
Snow total in inches, ... 58.0

Weather.

Mean cloudiness observed, ... 48 per cent.
Total cloudiness recorded by Sun Thermometer, ... 1770 hrs.=40 per cent.
Number of clear days, ... 129
Number of fair days, ... 137
Number of cloudy days, ... 99

Bright Sunshine.

Number of hours recorded, 2684 hrs.=60 per cent.

Dates of Frosts.

Last, ... May 18th
First, ... Sept. 11th

Dates of Snow.

Last, ... April 27th
First, ... Nov. 24th
Total days of sleighing, ... 95

Gales of 50 or More Miles Per Hour.

Jan. 14th, 57m., S.S.W.; Feb. 5th, 55m., S.W.; Feb. 10th, 52m, N.W.; April 10th, 84m., N.W.; Oct. 24th, 51m., S.; 30th, 58m, S.W.

* Temperature in ground shelter.

A. L. CHANDLER,
Observer.

J. E. OSTRANDER,
Meteorologist.

BULLETIN No. 349. JANUARY, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.20, 28th, 6 A
Minimum reduced to freezing,	28.52, 15th, 1 P
Reduced maximum reading	30.54, 28th, 6 A
Reduced† minimum reading,	28.84, 15th, 1 P
Mean semi-daily reduced	29.875
Monthly range	1.70

***Air Temperature.** In Degrees Fahr.

Highest	44.0, 12th, 2:30 P
Lowest	−20.0, 2nd, 7:30 A
Mean hourly	13.3
Mean of means of max. and min.	13.9
Mean sensible (wet bulb)	10.9
Monthly range	64.0
Highest mean daily	33.7, 12th
Lowest mean daily	−6.4, 2nd
Mean maximum	22.9
Mean minimum	4.9
Mean daily range	18.0
Greatest daily range	33.0, 31st
Least daily range	6.0, 13th

Humidity.

Mean dew point	5.9
Mean force of vapor	.084
Mean relative humidity	77.1

Precipitation. In inches.

Total precipitation, in inches	4.11
Total snow, in inches	18½
Number of days on which .01 inch or more rain fell	11
Days of sleighing,	31

Wind.

Total movement	5491 m
Greatest daily movement	391m, 4th
Least daily movement	11m, 18th
Mean daily movement	177 m
Mean hourly velocity	7.4 m
Maximum pressure per square foot, 8.5 lbs = 41m per hour, 11th, 2 A, N.W.	
Maximum velocity for 5 minutes, 32m per hour, 11th, 2 A, N.W.	
Prevailing direction, West Northwest.	

Summary.

North	16 per cent
North Northwest	13 " "
Northwest	22 " "
West Northwest	10 " "
West Southwest	16 " "
West	10 " "
Other directions	13 " "

Weather.

Mean cloudiness observed	44 per cent
Total cloudiness recorded by the Sun Thermometer	121 hours = 41 per cent
Number of clear days	9
Number of fair days	14
Number of cloudy days	8

Bright Sunshine.

Number hours recorded, 173 hrs, = 59 per cent.

Rain, 7th, 12th.

Snow, 7th, 8th, 10th, 11th, 12th, 15th, 17th, 18th, 19th, 22d, 24th, 25th, 28th, 29th.

Hail, 7th, 28th.

Gales, 40m 3d, N; 36m 5th, N.W.; 36m 10th, N.W.; 41m 11th, N.W.; 39m 12th, W.S.W.; 36m 15th, N.W.; 40m 20th, W.N.W.; 35m 23d, W.N.W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.28	29 97	30.067	10.0	4 P	−11.0	12 P	−0.5	−4.3	−7.5	7.8
2	30.14	30.01	30.097	5.0	4 P	−20.0	7:30 A	−7.5	−6.4	−10.3	6.5
3	30 14	29.94	30.039	9.0	4 P	−10.0	6 A	−0.5	−1.0	−2.3	4.3
4	29 94	29.66	29.747	13.5	3 P	−2.0	1 A	5.7	5.0	1.3	8.3
5	29.72	29.62	29.631	23.5	3 P	14.0	12 P	18.7	14.9	12.5	8.3
6	29.96	29.72	29 910	31.5	3 P	11.0	4 A	21.3	18.3	13 5	8.2
7	29 95	29.45	29.602	31.5	1 P	13.0	0 A	22.3	26 0	27.0	0.0
8	29.55	29.42	29.435	30.0	2 A	20.0	12 P	25.0	25.9	23 5	1.1
9	29.56	29 45	29.485	27.0	1:30 P	17.0	4:30 A	22.0	21.9	19.5	4.8
10	29.66	29.45	29.546	28.0	0:30 P	16.0	7 A	22.0	22.0	19.0	4.6
11	29.90	29.66	29.862	36.0	2 P	20.0	7:30 A	28.0	26.4	20.7	8.0
12	29.82	29 14	29.283	44.0	2:30 P	19 0	12 P	31.5	33.7	31.0	3.8
13	29.94	29.45	29.753	10.0	4:30 P	4.0	12 P	7.0	7.9	4.7	7.0
14	29.99	29 89	29.957	25 5	4 P	4.0	0 A	14.7	14.5	11.5	5.7
15	29.89	28 84	29.309	27.5	5 P	14.5	5 A	21.0.	19.8	18.7	0.5
16	29 96	29.49	29 828	32.0	4 P	11.0	12 P	21.5	19.9	13.7	8.5
17	29.98	29.82	29 891	20.0	4:30 P	3.5	2:30 A	11.7	12.2	12.3	1.0
18	30.01	29 83	29 927	22.0	3:30 P	3.5	7:30 A	12.7	11.1	16 5	6.6
19	30.03	29 81	29.874	26.5	1 P	1.0	12 P	13.7	15.9	12 5	4.9
20	30.12	29 94	30 107	15.5	3:30 P	-6.5	7 A	4 5	6 0	2.3	7.1
21	30.26	30.11	30.177	27.5	3 P	3.5	5 A	15 5	14 0	9.7	8.4
22	30.20	29.61	29.820	15 5	4 P	0.5	3:30 A	8.0	7.8	8.7	0.0
23	29.87	29.61	29.738	21.0	2 P	1.5	4 A	11.3	11.2	7.7	8.6
24	29.87	29.71	29 799	22.0	2:30 P	4 0	2:30 A	13 0	12 2	8.5	7.7
25	29.74	29 61	29.676	25.5	4:30 P	11.5	4:30 A	18.5	16.0	14.2	5.0
26	30.22	29 74	30.068	29 5	4:30 P	11 0	12 P	20.3	16 4	14.3	8.0
27	30.44	30.19	30 363	19.0	3 P	1.5	6 A	10 3	6.8	2.7	8.0
28	30 54	30.15	30.383	9.0	8:30 P	−2.5	7 A	3.3	2.8	2.0	0.6
29	30 28	30 03	30.131	29 5	3:30 P	7.0	0 A	18.3	14.8	12.0	7 6
30	30.45	30.27	30.384	20.0	2 P	0 0	12 P	10.0	10.6	7 0	6 2
31	30.35	30.19	30.259	25.5	3 P	−7.5	3:30 A	9.0	9.3	10.0	6 0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	-10.5	.033	84.0	N.	144	2.5	22	6 A				
2	-14.0	.031	81.0	W.S.W.	22	0.0	—	—				
3	-6.0	.043	79.5	N.N.E.	246	8.0	40	9 P				
4	-1.0	.050	88.5	N.	391	5.5	33	1 P				
5	6 0	.089	68.5	N.	326	6.5	36	3 P				
6	8.0	.089	74 0	N.N.W.	168	2.0	20	12 M				
7	24.0	.155	86.0	N.N.W.	90	0.5	10	2 P	7 A	2 P	.70	¾
8	18.5	.139	75.5	N.	150	2.5	22	6 P	6 A	7 A	T	T
9	13.0	.118	69.5	N.W.	231	5.0	32	1 P				
10	12.0	.117	69.5	N.W.	347	6.5	36	12 M	9:30A	4 P	T	T
11	13.5	.126	68.0	W.N.W.	202	8.5	41	2 A	11:30P	12 P	10	1
12	25.5	.197	73.0	S.S.W.	282	7.5	39	9 P	0 A	8:30A	1.65	1
13	-1.5	.058	67.5	W.S.W.	357	3.0	24	3 A				
14	3 5	.088	60.0	W.S.W.	212	2.5	22	2 P				
15	16.0	.110	83.5	N.W.	184	6.5	36	6 P	1:30A	3 P	1.06	6¼
16	7.5	.091	70.5	W.	284	4.0	28	1 A				
17	11 0	.081	91.0	W.	43	0.0	—	—	6 A	1 P	.07	¾
18	7.5	.076	87.0	N.W.	11	0.0	—	—	10:30P	12 P	.05	1
19	8.5	.085	80.5	W.N.W.	89	1.0	14	3 P	0 A	5:30A	.12	2
20	-1.5	.054	81.0	W.S.W.	198	8.0	40	12 M				
21	2.5	.075	64 0	W.N.W.	170	2.5	22	12 M				
22	4.5	.066	85.0	N.N.W.	47	0.5	10	10 P	10 A	6 P	.18	3½
23	0.5	.068	72.0	W.S.W.	208	6 0	35	3 P				
24	4.5	.070	79.5	S.S.W.	128	2.0	20	3 P	4:30P	9 P	T	T
25	12 5	.088	93 0	W.	29	0.0	—	—	3 A	11 A	.03	½
26	8 0	.093	70 0	N.W.	246	5.0	32	6 A				
27	-3.5	054	70 5	N.	229	4.0	28	5 A				
28	-2.0	.052	80.0	N.N.W.	215	3.5	26	6 A	2:30P	12 P	0.10	1
29	6.0	.085	71.5	N.W.	144	3.0	24	7 P	0 A	5 A	.05	⅝
30	4 5	.064	86 5	N.W.	72	0.0	—	—				
31	5.5	.073	80.0	S.W.	26	0.0	—	—				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The predominating feature of the weather for the month was the extreme cold which prevailed with practically no cessation during the entire period. The month opened with the first three days averaging below zero for each day, and taken with the last three days of December when the same conditions prevailed, gave a period of six consecutive days when the mean hourly temperature was below zero—an unprecedented record for this locality. Just as the preceding month was the coldest December on our records, so the month just closed proved to be the coldest January of which we have any record at this station. In fact it was the coldest month of which there is any authentic record for Amherst, dating back to 1836.

There was but one day during the month when the mean temperature was above freezing, and since the last of November there have been but three days with a mean hourly temperature above 32 degrees. While the minimum temperature for January was not quite so low as the December minimum, the mean temperature for January was about three and one-half degrees lower than the December mean. The usual January thaw did not put in an appearance. The month closed with zero weather on the last day.

The mean barometer was extremely low in contrast with the unusually high record for December. The range of pressure was much greater than usual, due to the very low record made near the middle of the month. The total wind movement was considerably more than the normal and nearly the whole time was from the Northwest quadrant.

The total precipitation was about one-half inch more than normal and the snowfall of more than eighteen inches was much greater than usual.

The mean dew point was extremely low, due to the low temperature which prevailed. The mean relative humidity was about the only normal feature for the month.

The hours of bright sunshine recorded were considerably more than usual.

J. E. OSTRANDER, Meteorologist.
A. L. CHANDLER, Observer.

BULLETIN No. 350. FEBRUARY, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.37, 21st, 12 P
Minimum reduced to freezing,	28.58, 26th, 6 A
Reduced maximum reading	30.70, 21st, 12 P
Reduced† minimum reading,	28.88, 26th, 6 A
Mean semi-daily reduced	30.063
Monthly range	1.82

***Air Temperature.** In Degrees Fahr.

Highest	51.0, 25th, 3 P
Lowest	-22.5, 2nd, 6 A
Mean hourly	20.5
Mean of means of max. and min.	19.6
Mean sensible (wet bulb)	18.0
Monthly range	73.5
Highest mean daily	42.3, 25th
Lowest mean daily	-9.1, 5th
Mean maximum	31.4
Mean minimum	7.7
Mean daily range	23.7
Greatest daily range	43.5, 2d
Least daily range	4.5, 28th

Humidity.

Mean dew point	12.8
Mean force of vapor	.126
Mean relative humidity	76.0

Precipitation. In inches.

Total precipitation, in inches	2.99
Total snow, in inches	11
Number of days on which .01 inch or more rain fell	11
Days of sleighing,	28

Wind.

Total movement	5632 m
Greatest daily movement	483m, 26th
Least daily movement	25m, 3d
Mean daily movement	201 m
Mean hourly velocity	8.4 m

Maximum pressure per square foot, 20.0 lbs = 63m per hour, 26th, 3 P, W.N.W.

Maximum velocity for 5 minutes, 45m per hour, 26th, , 1 P, W.N.W.

Prevailing direction, West.

Summary.

South Southwest	25 per cent
West Northwest	14 " "
North Northwest	14 " "
Northwest	11 " "
West	11 " "
Southwest	11 " "
Other directions	14 " "

Weather.

Mean cloudiness observed	45 per cent
Total cloudiness recorded by the Sun Thermometer	142 hours = 48 per cent
Number of clear days	9
Number of fair days	9
Number of cloudy days	10

Bright Sunshine.

Number hours recorded, 154 hrs, = 52 per cent

Rain, 15th, 19th, 25th, 26th, 28th.

Snow, 3d, 6th, 9th, 10th, 17th, 22d, 28th.

Hail, 9th, 28th.

Gales, 57m, 4th, W.NW.; 46m 5th, W.N.W.; 42m, 14th, S.S.W.; 39m, 15th, N.W.; 39m, 19th, S.W.; 57m, 20th, N.W.; 44m, 21st, S.S.W.; 53m, 25th, S.W.; 63m, 26th, W.N.W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean, Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.38	30.22	30.312	19.0	2 P	-8.0	12 P	5.5	9.3	5.5	8.5
2	30.34	30.16	30.281	21.0	3 P	-22.5	6 A	-0.7	-0.3	-2.0	8.5
3	30.22	29.63	29 897	13 5	12 P	-11.0	6 A	1.3	3.1	3.7	0.3
4	29 90	29.61	29.776	23 0	3:30 A	-7.5	12 P	7.7	8.1	4.7	8.8
5	30.40	29.90	30.258	-1.0	3:30 P	-14.5	7:30 A	-7.7	-9.1	-12.0	8.4
6	30.39	29.97	30.120	26.0	12 P	-10 0	0 A	8.0	10 6	12.2	0.5
7	30.19	29 96	30.053	40.0	3:30 P	26.0	0 A	33 0	30.9	28.0	4.6
8	30.51	30.19	30.436	28.0	4:30 P	2.5	12 P	15.3	17.5	12.7	8.8
9	30.51	29.81	30.053	36.5	8:30 P	-3.5	4 A	16.5	16.3	17.5	0.0
10	29.97	29 83	29.903	30.0	1:30 P	16.0	7:30 A	23.0	22.1	19 5	4.9
11	30.11	29 83	29.961	35.0	3:30 P	7 0	7:30 A	21.0	24 5	21.7	8.8
12	29.83	29.44	29.615	43.0	4:30 P	26.0	7 A	34.5	34.5	31.7	3.5
13	30.18	29 43	29.928	49.0	2 A	23.5	12 P	36.3	37.5	31.0	6.1
14	30.37	29 86	30 217	39 5	3 P	16 0	7 A	27.7	29.3	25 2	0.9
15	30.17	29.52	29.725	48 5	0:30 P	20.5	12 P	34 5	36 5	37.7	0.0
16	30.36	30.14	30 306	24.5	4 P	16.0	8 A	20.3	19.5	16.0	7.3
17	30.50	30.05	30.238	25.0	3:30 P	8.5	12 P	16.7	17.2	13 7	9.7
18	30.65	30.50	30.590	30.0	5 P	0.0	7:30 A	15.0	16.1	11.7	9.7
19	30 53	29 74	30.080	40.0	12 P	19.0	2 A	29 5	31.5	33.3	0.0
20	30.33	29.53	29.870	47.0	9 A	10.0	12 P	28.5	32 2	28.7	7.2
21	30.70	30.33	30.610	10.0	0 A	2.0	12 P	6.0	4.8	1.3	8.1
22	30.70	30.12	30 398	12.0	5 P	-7.0	7 A	2.5	5.3	2.3	4.5
23	30.14	29.81	29.940	29.0	4:30 P	-10 0	7 A	9 5	14.0	11 7	7.7
24	29.81	29.55	29 657	43.0	5:30 P	14.0	6 A	28.5	28.4	25.5	1.3
25	29 86	29.51	29.737	51.0	3 P	32.0	1:30 A	41.5	42.3	37 0	8.4
26	29.83	28 88	29 406	45 0	5:30 A	22 0	12 P	33.5	31.4	29.3	8.1
27	30.19	29 83	30.138	38.0	5 P	19 5	7:30 A	28 7	28.5	25 0	9 7
28	30.29	30.19	30.271	35.0	12 M	30.5	7 A	32.7	32.6	31.7	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	-1.5	.064	68.0	N.W.	137	4.5	30	9 A				
2	-9.0	.050	65.5	W.N.W.	53	6.5	10	3 A				
3	0.0	.059	80.5	W.	25	0.0	—	—	7:30A	7:30P	.12	1
4	-3.0	.062	66 5	W.N.W.	316	16.0	57	4 A				
5	-17 0	.027	72.5	N.N.W.	312	10.5	46	10 A				
6	5.0	.092	72.0	S.S.W.	193	5.5	33	8 A	11:30A	9 P	.15	3
7	24.0	.164	82.0	N.W.	84	1.5	17	7 A				
8	5.0	.088	66.0	N.N.E.	167	5.0	32	8 A				
9	14.0	.135	82.5	W.N.W.	108	2.0	20	11 P	3 A	5 P	.44	2
10	16.0	.112	84.5	S.W.	95	0.5	10	2 P	2:30P	4:30P	.02	¼
11	18 5	.131	85.0	S.S.W.	163	4.5	30	2 P				
12	28 0	.199	83.0	S.S.W.	146	2.5	22	7 P				
13	26.5	.190	78.5	N.W.	238	4.5	30	4 A				
14	20.5	.161	80.0	S.S.W.	91	9.0	42	8 P				
15	31.5	.210	87.0	W.S.W.	232	7.5	39	7 P	2 A	4:30A	.08	
16	8.0	.104	63.5	N.	196	3.5	26	6 A				
17	9.0	.089	74 5	N.W.	193	4.5	30	11 A	3 A	4:30A	.07	*
18	7.0	.090	74.5	S.W.	96	1.5	17	3 P				
19	32 0	.199	92.5	S.S.W.	380	7.5	39	12 M	11:30A	11 P	.65	
20	25.5	.198	79 5	W.	431	16.0	57	8 P				
21	-7 5	.051	61.0	N.W.	415	9.5	44	2 P				
22	-4.0	.057	72.5	W.	124	3.0	24	10 A	1 P	11 P	.30	3
23	6.0	.095	71.5	S.S.W.	109	3.5	26	6 A				
24	23.0	.165	84 5	S.S.W.	66	1.0	14	6 P				
25	31.5	.258	67.0	W.	131	14 0	53	11 P	10:30P	12 P	.15	
26	23.0	.192	70.0	W.N.W.	483	20.0	63	3 P	0 A	8 A	.61	
27	19.0	.153	71.5	W.S.W.	360	4.0	28	1 P				
28	30.0	.184	92 5	S.	89	0.0	—	—	11 A	12 P	.40	¼

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during February was more nearly normal, especially the temperature record, than that of the preceeding two months. Abnormally low temperature, however, continued through the first third of the month. The mean for that period was less than ten degrees above zero, making it one of the coldest periods of the entire winter. For thirty-six consecutive hours, on the 4th—6th, the thermometer did not register above zero—a most unusual occurrence here. Large and rapid changes in barometric pressure and high winds were also important features.

A comparison of the records of the several weather elements with the normals for this station shows the following features of interest: The mean barometer was slightly higher than the normal and the range of pressure was almost as great as the normal *annual* range. The minimum barometer was exceptionally low. The total wind movement was large and on four dates gales of more than 50 miles per hour were recorded on the pressure chart. Throughout the month practically all of the wind was from the western points of the compass.

The mean temperature was nearly four degrees below the normal and the minimum record was more than fourteen degrees lower than the average value for this feature. The maximum temperature was practically normal giving a very large range for the month.

The mean dew point was about four degrees lower than usual and the relative humidity was slightly below the normal.

The total precipitation was about ten per cent. less than the normal and was well distributed throughout the month. Snow has covered the ground continuously since the first of December.

The amount of sunshine recorded was practically normal.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 351. MARCH, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.14, 11th, 10A
Minimum reduced to freezing,	29.14, 15th, 3 A
Reduced maximum reading . .	30.46, 11th, 10A
Reduced† minimum reading, .	29.45, 15th, 3 A
Mean semi-daily reduced	29.989
Monthly range	1.01

***Air Temperature.** In Degrees Fahr.

Highest	69.0, 31st, 4 P
Lowest	8.5, 11th, 7 A
Mean hourly	34.9
Mean of means of max. and min.	35.4
Mean sensible (wet bulb)	30 3
Monthly range	60.5
Highest mean daily	51.3, 31st
Lowest mean daily	18.6, 11th
Mean maximum	47.0
Mean minimum	23.9
Mean daily range	23.1
Greatest daily range	36.5, 31st
Least daily range	6.5, 1st

Humidity.

Mean dew point	24.6
Mean force of vapor	.203
Mean relative humidity	71.9

Precipitation. In inches.

Total precipitation, in inches	2.91
Total snow, in inches	9½
Number of days on which .01 inch or more rain fell	8
Days of sleighing, . . .	10

Wind.

Total movement	5791 m
Greatest daily movement	606m, 3d
Least daily movement	37m, 21st
Mean daily movement	184 m
Mean hourly velocity	7.6 m

Maximum pressure per square foot, 18.0 lbs = 60m per hour, 3d, 2 A.M. N.W.

Maximum velocity for 5 minutes, 38m per hour, 2d, 2 A, N.W.

Prevailing direction, West Northwest.

Summary.

South Southwest	13 per cent
North Northwest	19 " "
Northwest	23 " "
West	10 " "
Southwest	10 " "
Other directions	25 " "

Weather.

Mean cloudiness observed	36 per cent
Total cloudiness recorded by the Sun Thermometer . .	117 hours = 32 per cent
Number of clear days	13
Number of fair days	14
Number of cloudy days	4

Bright Sunshine.

Number hours recorded, 252 hrs, = 68 per cent

Rain, 1st, 6th, 10th, 14th.

Snow, 4th, 5th, 7th, 9th, 10th, 14th.

Hail, 1st, 9th, 10th.

Thunder and Lightning, 14th.

Gales, 60m, 3d, NW.; 45m, 10th, N.; 36m, 12th, S.S.W.; 47m, 15th, N.W.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.24	30 09	30.156	35.5	3:30 P	29.0	12 P	32.3	32.1	32.0	0.8
2	30.23	29.67	30.015	43.5	12 P	21.5	6 A	32.5	33.3	30.7	9.5
3	30.34	29.65	30.030	43.5	0 A	18 5	12 P	31.0	30 5	25.0	10.0
4	30.39	29.97	30.219	36.0	4 P	12 0	7 A	24.0	24.5	21.7	6.0
5	29 97	29 82	29.799	47 5	3 P	28 5	0 A	38.0	36 5	34.0	7.5
6	29.82	29.54	29.659	47.0	3:30 P	29.5	12 P	38.3	38 2	33.7	5.2
7	30.07	29 73	29.884	29.5	0 A	16.5	12 P	23.0	23.3	20.5	8.0
8	30.13	30.01	30.071	43 0	4 P	10.5	5:30 A	26.7	27.1	25 5	8.7
9	30 24	29 90	30.160	39.0	2 P	28.0	4 A	33.5	32 6	28.3	7.7
10	30.18	29.51	29.794	32.0	3 A	10.5	7:30 P	21.3	22.3	15.7	0.9
11	30.46	30.18	30.388	28.0	5 P	8.5	7 A	18.3	18.6	15.7	7.0
12	30.31	29 76	29 891	41.0	10 P	18.0	6 A	29.5	31.6	33 0	2.4
13	30.10	29 75	30.021	50.5	3:30 P	36.0	10 P	43.3	41.1	32.7	8.5
14	30.05	29.49	29 794	39 0	0 A	30.0	9 A	34.5	33.0	30 0	0.0
15	30.30	29 45	29 958	38.5	3:30 P	11.0	12 P	24.7	25.9	20.7	9.3
16	30.32	30.08	30.184	38.0	5 P	10 0	5 A	24.0	25.0	24.0	10.0
17	30 08	29.68	29.820	56.5	3 P	24.5	5 A	40.5	41.6	36.0	10.5
18	30.04	29.75	30.006	48.0	4 P	33.5	7 A	40.7	38.9	31.0	11.2
19	30.18	29.92	30.054	58.0	3 P	26 5	7 A	42.3	40.2	33.3	10.5
20	30.21	30.06	30.124	54.0	5 P	27.5	7 A	40.7	39 4	35.7	8.7
21	30.06	29 89	29 970	63.0	4:30 P	33.0	8:30 A	48.0	43.5	41.3	7.8
22	29.89	29 66	29.782	66.0	5 P	37.0	5:30 A	51.5	47.7	39.0	9.1
23	30.20	29 86	30.105	45 0	3:30 P	28.0	12 P	36.5	36.7	31.0	11.7
24	30.19	29.91	30 056	56 5	5:30 P	22.0	5:30 A	39.3	37.6	32.5	11.3
25	29.91	29.54	29 676	55.5	2 P	30.5	0 A	43.0	40.9	34 5	10.0
26	29 81	29.52	29.674	40.0	2 P	29.0	12 P	34.5	35.0	30.5	6.7
27	30 11	29.81	29.979	38.0	2:30 P	24 5	7 A	31.3	32.1	29.7	8.1
28	30.28	30.11	30.239	52.0	5 P	22.0	7 A	37.0	36.6	31.0	12.0
29	30.37	30.18	30 289	60.5	4:30 P	26.5	7 A	43.5	41.8	34.0	12.0
30	30.18	29.87	29.990	63.5	3 P	27.5	6 A	45.5	44.1	37 0	10.5
31	29.89	29.77	29.860	69.0	4 P	32.5	6:30 A	50.7	51 3	40.7	10.9

DAILY SUMMARY.

	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	30.5	.185	92.5	N.N.W.	55	1.5	17	11 P	0 A	1:30 P	.96	
2	26.5	.188	79.5	W.	197	3.0	24	9 A				
3	17.5	.152	63.5	N.W.	606	18.0	60	2 A				
4	17.0	.130	79.0	S.S.W.	239	5.5	33	6 P	8 P	12 P	.06	1¼
5	31.0	.213	83.0	S.S.W.	102	0.5	10	1 A	0 A	3 A	.08	***
6	29.0	.215	76.5	W.N.W.	194	2.5	22	7 A	3 A	9 A	.19	
7	15.0	.121	73.0	N.N.E.	175	1.0	14	11 P	2 A	1:30 P	.21	3
8	21.5	.152	81.0	S.W.	136	1.0	14	11 P				
9	21.5	.173	70.5	W.	162	2.5	22	1 A	6 P	12 P	.40	1½
10	16.0	.115	84.5	N.	224	10.0	45	9 P	0 A	7 P	.65	1¾
11	9.5	.100	69.0	S.W.	208	2.0	20	3 P				
12	30 5	.194	87.5	S.S.W.	215	6.5	36	2 P				
13	24.0	.224	59 0	N.W.	215	4.0	28	6 A				
14	27.0	.176	85.0	N.E.	89	0.5	10	4 A	5 A	7:30 P	.36	1¼
15	12.0	.240	61.0	N.W.	408	11.0	47	1 P				
16	18 0	.151	71.5	W.N.W.	284	3.5	26	1 P				
17	26.0	.270	53.5	W.	221	4.5	30	11 P				
18	22 0	.208	59 0	N.W.	262	5.5	33	0 A				
19	28.0	.216	71.5	S.S.W.	98	0.5	10	6 P				
20	31.5	.235	78.0	S.	104	0.5	10	3 P				
21	39 0	.287	89.5	S.	37	0.0	—	—				
22	35.0	.294	78.5	N.N.W.	100	3.0	24	1 P				
23	23.5	.203	63.5	N.N.W.	303	5.5	33	1 P				
24	26.0	.215	65.0	N.N.W.	83	1.0	14	9 A				
25	27.5	.222	64.5	N.W.	260	1.5	17	2 P				
26	24.0	.192	71.0	N.W.	176	3.0	24	3 P				
27	25.5	.180	77.5	N.W.	170	2.0	20	2 P				
28	24.0	.202	65.0	N.N.W.	183	1.5	17	3 P				
29	24.0	.244	56 0	N.N.W.	480	0.0	—	—				
30	29.5	.270	61.0	S.W.	88	1.0	14	3 P				
31	33.0	.337	60.0	S.W.	10	1.5	17	2 P				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during March was much nearer normal than during the preceding two months. This was especially noticeable in the temperature record after the unprecedented cold which had prevailed. The accumulated snow of the winter which covered the ground at the beginning of the month gradually disappeared without any especially noticeable high water in the rivers, and the equinoctial period was free from storms. At the close of the month, while there was still much frost in the ground, the snow had practically all disappeared. No precipitation was recorded after ihe 14th.

The record of the several weather elements shows the following as the more important features: The mean barometer was practically normal and the range unusually small for the time of year. Although the barometer during the month was comparatively steady the total wind movement was practically normal. The wind movement on the 3d of more than 600 miles was an exceptionally high record for this station.

The mean temperature was slightly higher than the normal, and the maximum was recorded on the last day of the month. The range of temperature was more than usual.

The mean dew point and relative humidity were bolh below the normal values.

The total precipitation was about three-fourths of the normal amount and occurred in a few storms early in the month.

The sunshine record was unusually large and there were but few cloudy days.

J. E. OSTRANDER, Meteorologist.
A. L. CHANDLER, Observer.

BULLETIN No. 352. APRIL, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.24, 7th, 9A
Minimum reduced to freezing,	29.29, 22d, 5 A
Reduced maximum reading	30.55, 7th, 9A
Reduced† minimum reading,	29.59, 22d, 5 A
Mean semi-daily reduced	30.071
Monthly range	0.96

***Air Temperature.** In Degrees Fahr.

Highest	79 5, 30th, 3 P
Lowest	24.0, 6th, 6:30 A
Mean hourly	45.7
Mean of means of max. and min.	46.2
Mean sensible (wet bulb)	40.1
Monthly range	55.5
Highest mean daily	62.4, 30th
Lowest mean daily	31.7, 11th
Mean maximum	58.5
Mean minimum	33.9
Mean daily range	24.6
Greatest daily range	44.5, 15th
Least daily range	7.0, 12th

Humidity.

Mean dew point	33.6
Mean force of vapor	.304
Mean relative humidity	69.2

Precipitation. In inches.

Total precipitation, in inches	2.78
Total snow, in inches	4½
Number of days on which .01 inch or more rain fell	13

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	4544 m
Greatest daily movement	341m, 24th
Least daily movement	46m, 17th
Mean daily movement	151 m
Mean hourly velocity	6.3 m

Maximum pressure per square foot, 7.5 lbs = 39m per hour, 24th, 12 M, W.N.W.

Maximum velocity for 5 minutes, 29m per hour, 24th, 12 M, W.N.W.

Prevailing direction, Northwest.

Summary.

North	23 per cent
South Southwest	10 " "
North Northeast	10 " "
West Northwest	10 " "
West	10 " "
North Northwest	10 " "
Other directions	27 " "

Weather.

Mean cloudiness observed	52 per cent
Total cloudiness recorded by the Sun Thermometer	167 hours = 42 per cent
Number of clear days	10
Number of fair days	13
Number of cloudy days	7

Bright Sunshine.

Number hours recorded, 235 hrs, = 58 per cent

Rain, 3d, 8th, 9th, 11th, 12th, 13th, 17th, 18th, 19th, 21st, 22d, 23d, 29th, 30th.

Snow, 11th, 12th, 13th.

Hail, 18th.

Thunder and Lightning, 17th, 23d.

Frosts, 5th, 6th, 7th, 14th, 15th, 20th, 25th, 26th.

Gales, 35 miles or more per hour: 39m. 24th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.82	29.69	29.783	73 5	2 P	37·5	6 A	55·5	54 3	46.3	10.5
2	29.84	29 70	29.777	72.0	2:30 P	47.0	7 A	59.5	56.6	48.0	8.2
3	29.93	29.80	29.883	52.5	1 P	35·5	11 P	44.0	44.0	38.5	3.2
4	30.05	29.85	29 980	50.0	3:30 P	31.0	7 A	40.5	38.0	30.3	10.1
5	30.30	30 05	30.233	48.0	5 P	26.0	6 A	37.0	37.1	30.7	12.1
6	30.43	30.26	30.367	63 0	5 P	24.0	6:30 A	43·5	44 4	37.0	12.1
7	30.55	30 43	30.523	61.5	2:30 P	29.0	5:30 A	45 3	44.1	37 0	10.8
8	30.53	30.23	30.396	58.5	3:30 P	31·5	5 A	45.0	45.7	40.3	6.1
9	30.35	30.17	30.298	49.0	12 M	30.0	12 P	39·5	40.8	37.3	1.7
10	30.45	30.16	30.434	49·5	3:30 P	29·5	6 A	39·5	38.1	33.3	7.6
11	30.44	30.19	30.325	43·5	2 P	33.0	6 A	38.3	36 8	30.7	6.5
12	30.19	29.98	30.038	36.0	0 A	29.0	9 P	32.5	31.7	30.3	0.8
13	30.02	29.91	29 964	39.0	3 P	29 5	1 A	34·3	35 2	34·5	4.9
14	30.06	29.95	29.992	63 0	3 P	35.0	0 A	49.0	48.3	42 0	10.7
15	30.09	29.98	30 042	73·5	4 P	29.0	6 A	51·3	52.9	42.5	11.8
16	30.06	29 86	29.964	71.0	3 P	35.0	6 A	53.0	54.2	45 3	9.6
17	29.86	29.61	29 732	73.0	3 P	36·5	5:30 A	54·7	54 4	48 5	8.2
18	30.04	29 60	29 914	54.0	0 A	32.0	12 P	43.0	38 4	33·3	0.0
19	30.47	30.03	30 328	50.0	4 P	32.0	0 A	41.0	38.9	32 0	11.0
20	30.50	30 24	30.387	52.0	2:30 P	26.5	6 A	39·3	41.7	33 5	7.8
21	30.24	29.65	29 895	45.0	0 A	37.0	10:30 A	41.0	39.8	38.3	0 0
22	29 77	29 59	29 665	59.0	3:30 P	39.0	0 A	49.0	47.4	43 7	7·3
23	29.84	29.70	29.801	70·5	3 P	42.0	5 A	56 3	54 1	52.5	9.0
24	30.13	29.74	29.980	47·5	5 P	37.0	12 P	42.3	41.9	35·3	10.7
25	30.24	30.10	30.156	58.5	5 P	32.0	6 A	45·3	44 5	38.0	12.3
26	30.27	30.14	30.220	69.0	5:30 P	28.5	6 A	48.7	49·3	44·7	12·5
27	30.27	30.16	30 225	69.0	2 P	31.0	6:30 A	50.0	51.1	42.0	9.7
28	30 21	30 04	30.106	69.0	2 P	34·5	5:30 A	51.7	54.0	48 0	11.9
29	30.10	29.87	29.953	55·5	8:30 A	45.0	3:30 A	50.3	51.1	51.5	0.0
30	29 91	29.77	29.824	79·5	3 P	51.0	5:30 A	65.3	62.4	56 5	7.7

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	42.0	.367	75.5	S.S.W.	171	3.5	26	5 P				
2	42.0	.413	71.0	W.	154	2 5	22	3 P				
3	33.0	.272	74.0	N.	91	1.0	14	12 P	0:30 P	8 P	.15	
4	19.0	.209	53.0	N.	197	3.5	26	7 P				
5	17 0	.213	46.5	N.N.W.	256	4 0	28	10 A				
6	27.0	.276	54.5	N.W.	70	0.5	10	12 M				
7	30.5	.261	70.0	S.S.W.	151	3.5	26	12 M				
8	34.5	.295	69 5	S.	71	0 5	10	8 P	3:30 P	5:30 P	T	
9	35.5	.241	88 5	N.	164	3.0	24	7 P	1 A	8 P	.15	
10	28.5	.328	77.0	N.N.E.	319	3.5	26	3 P				
11	24.0	.198	65.5	N.E.	247	4 0	28	8 A	10:30 P	12 P	.02	
12	28.0	.172	92.5	N.	217	2.0	20	1 P	0 A	12 P	.48	3½
13	31.5	.217	82.0	N.	158	1.5	17	2 P	0 A	8:30 A	.11	
14	33.5	.341	58.5	N.	189	3.0	24	11 A				
15	33 0	.371	54.0	N.N.W.	73	1.5	17	4 P				
16	37.0	.389	57.0	W.N.W.	53	1.0	14	4 P				
17	44.5	.396	77 0	W.	46	1.0	14	12 M	7 P	12 P	.22	
18	30 5	.203	83.5	E.	83	0.5	10	11 A	8 A	12 P	.06	
19	20.0	.226	53.5	N.N.E.	165	2 5	22	9 A	0 A	5:30 A	.03	
20	22.0	.252	49.0	W.S.W.	77	0.5	10	1 P				
21	36.5	.239	91.5	N.	130	0.5	10	4 P	3:30 A	9:30 P	.87	
22	41.0	.313	83 0	W.N.W.	176	4 5	30	10 A	6:30 A	10:30A	.24	
23	47.0	.314	80.5	S.W.	187	2.5	22	3 P	8 P	9:30 P	.25	
24	28 5	.243	65 0	W.N.W.	341	7.5	39	12 M				
25	28.5	.292	54 5	N.W.	239	3 0	24	10 A				
26	35.0	.393	56.0	N.N.W.	139	3.0	24	10 A				
27	33 0	.350	56.0	S.	78	0.5	10	2 P				
28	42.0	.406	65.5	W.	129	1.0	14	2 P				
29	50 5	.412	95 0	N.N E.	49	0.0	—	—	9:30 A	12 P	.15	
30	54.0	.533	79.0	S.S.W.	124	2.0	20	6 P	0 A	3 A	.05	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during April was nearly normal in most respects and presented but few features of especial interest. A snowstorm on the 11th–13th, of more than four inches was perhaps the most unusual feature. The middle third of the month was rather cold and more or less stormy and delayed the season's progress to a considerable extent. At the close of the month the seasonal advance was hardly up to the normal.

The various weather elements show the following features of more or less interest: The mean barometer was considerably higher than the normal and the range of pressure rather small for the season. The maximum barometer was about the usual value while the minimum was considerably higher than the normal for this feature. The rather steady barometric pressure gave a total wind movement of about eighty per cent of the normal, and but a single gale was recorded on the pressure chart. The wind was from the northerly points of the compass more than one-half the time.

The mean temperature was nearly normal and the range slightly smaller than usual. The last day of the month was much the warmest and the maximum temperature reading was recorded that day. Freezing temperature was recorded near the end of the month but no material damage resulted.

The mean dew point was slightly lower than normal and the relative humidity a little higher than usual.

The total precipitation was about nine-tenths of the normal and was fairly well distributed throughout the month. The rainstorm of the 21st was the greatest of the month. The amount of sunshine was in excess of the average.

J. E. OSTRANDER, Meteorologist.
A. L. CHANDLER, Observer.

NOTE—The regular observations at this station are continued at 8 A. M. and 8 P. M. *75th meridian time.*

BULLETIN No. 353. MAY, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing	30.20, 16th, 6 A
Minimum reduced to freezing	29.22, 10th, 6 P
Reduced maximum reading	30.50, 16th, 6 A
Reduced† minimum reading	29.51, 10th, 6 P
Mean semi-daily reduced	30.061
Monthly range	0.99

***Air Temperature.** In Degrees Fahr.

Highest	86.5, 7th, 2 P; 28th, 4:30 P
Lowest	36.0, 2d, 5 A
Mean hourly	62.1
Mean of means of max. and min.	62.2
Mean sensible (wet bulb)	55.7
Monthly range	50 5
Highest mean daily	74.0, 28th
Lowest mean daily	31.2, 1st
Mean maximum	74.8
Mean minimum	49.7
Mean daily range	25.1
Greatest daily range	38.0, 18th
Least daily range	7.5, 30th

Humidity.

Mean dew point	53.1
Mean force of vapor	.545
Mean relative humidity	72.2

Precipitation. In inches.

Total precipitation, in inches	2.47
Total snow, in inches	
Number of days on which .01 inch or more rain fell	12

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	4906 m
Greatest daily movement	345m, 10th
Least daily movement	57m, 22d
Mean daily movement	158 m
Mean hourly velocity	6.6 m

Maximum pressure per square foot, 6.5 lbs = 36m per hour, 6th, 3 P, S.S.W.; 10th, 4P, S.

Maximum velocity for 5 minutes, 24m per hour, 10th, 4 P, S.

Prevailing direction, South Southwest.

Summary.

South	23 per cent
South Southwest	29 " "
Other directions	48 " "

Weather.

Mean cloudiness observed	51 per cent
Total cloudiness recorded by the Sun Thermometer	195 hours = 43 per cent
Number of clear days	7
Number of fair days	16
Number of cloudy days	8

Bright Sunshine.

Number hours recorded, 258 hrs, = 57 per cent

Rain. 1st, 6th, 10th, 12th, 13th, 14th, 21st, 22d, 25th, 27th, 29th, 30th, 31st.

Thunder and Lightning, 6th, 10th, 27th.

Frosts, None.

Gales, 35 miles or more per hour: 36m. 6th, S.S.W.; 35m, 8th, S.W.; 36m, 10th, S.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.04	29.68	29.857	59.5	12 M	44.0	12 P	51.7	51.2	46.7	2.1
2	30.21	30.03	30.122	66.5	4 P	36.0	5 A	51.3	54.1	48.7	9 6
3	30.03	29.87	29 935	67.0	4:30 P	48.5	6 A	57.7	58.9	52.0	11.0
4	30.03	29.85	29 920	71.0	2:30 P	46.0	6 A	58.5	58.1	50.5	11.4
5	30.09	29.93	30 041	70.0	2:30 P	37.0	5:30 A	53.5	54.0	47 0	11.7
6	30.00	29.86	29.935	86.0	1 P	49.0	2 A	67.5	66.0	59.7	9.0
7	29.93	29.66	29.759	86.5	2 P	59.0	6 A	72.7	71.5	62.5	8.5
8	29.88	29 66	29.754	72.0	2 P	45.0	12 P	58.5	61.5	52.0	9.2
9	29 97	29 88	29.933	73 0	5:30 P	38.5	5:30 A	55.7	57.2	51.5	12.3
10	29.90	29.51	29 658	78.0	2:30 P	51.0	4 A	64 5	63.8	57.5	10.2
11	30.10	29.66	30.015	74 5	5:30 P	46.0	6 A	60.3	58 4	49.5	12.2
12	30.13	29.96	30.046	74.5	2:30 P	50.5	5 A	62.5	60.7	56.0	4.3
13	30.01	29.88	29 976	80.5	2:30 P	61.0	0 A	70.7	67.6	62.7	7.5
14	30 26	29.99	30.142	71.0	5 P	50.5	12 P	60.7	60.7	56 3	4.5
15	30.43	30.26	30.372	75.0	5 P	44 5	5 A	59.7	60.0	51.0	13.3
16	30.50	30.35	30.417	74.0	3:30 P	41.0	5 A	57.5	58.7	48.3	12.5
17	30.38	30.22	30.333	85.0	3 P	43.0	6 A	64.0	64.0	52.5	11.5
18	30.27	30.10	30.195	86.0	3 P	48.0	5:30 A	67.0	66.7	56.0	11.2
19	30.12	30 01	30.102	83.0	2 P	53.0	5:30 A	68.0	67.1	61.0	9.0
20	30.14	30.06	30.138	84.0	3 P	58.0	4:30 A	71.0	69.7	62 5	9.5
21	30.29	30.15	30.267	73.5	3:30 P	61.5	5:30 A	67.5	66.7	64.0	3.3
22	30.29	30 08	30.208	68 5	5:30 P	58.0	12 P	63.3	62.5	59 0	1.3
23	30.21	29.95	30 063	79 5	2:30 P	52.5	12 P	66 0	65 6	59.0	9.7
24	30 35	30.21	30.292	73.5	3 P	44.5	5:30 A	59 0	58.9	49.7	12.5
25	30.23	29.85	29 987	73 5	4 P	49.0	3 A	61.5	61.3	58.7	8.5
26	30.17	29.92	30.108	73.0	2:30 P	56.0	12 P	64.5	64.2	57.5	9.0
27	30.14	29.91	29.968	81.0	6 P	51.0	5:30 A	66.0	64.7	62.0	8.0
28	30.14	29.92	29 983	86.5	4:30 P	63.5	4 A	75.0	74.0	68.0	9.5
29	30.29	30.14	30.248	62.5	3:30 P	52.0	12 P	57.3	58.7	54.7	0.5
30	30.23	30.12	30.194	57.0	6:30 P	49.5	4 A	53.3	53.6	51.3	0.2
31	30.12	29.82	29.908	73.0	4:30 P	53.5	5 A	63.3	61.1	58.3	5.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	45.0	.341	88.0	N.	205	2.5	22	2 P	0 A	8 P	90	
2	41.5	.444	60.5	W.N.W.	196	3.5	26	5 P				
3	45 0	.497	61.5	N.W.	155	2.0	20	3 P				
4	43.5	.478	59.5	N.	84	1.0	14	3 P				
5	42.0	.389	68.0	S S.W.	176	4.5	30	4 P				
6	56.5	.625	74 5	S.W.	115	6.5	36	3 P	10:30 P	11 P	.03	
7	59.0	.751	67.5	S.S.W.	154	3.5	26	6 P				
8	46.5	.507	66.5	S.	310	6.0	35	11 A				
9	45.0	.494	60.0	W.	157	2.0	20	1 P				
10	53 5	.565	74.0	S.	345	6.5	36	4 P	7 P	7:30 P	.06	
11	43.0	.432	61.5	S.S.W.	163	4 5	30	1 A				
12	54.0	.505	82.5	S.	174	2 5	22	3 P	1 P		T	
13	61 0	.638	85.0	S.S W.	312	5.0	32	4 P	8:30 P	12 P	.40	
14	54.0	.510	84.5	N.W.	102	1.0	14	1 A	0 A	7:30 A	.30	
15	42.5	.512	53.5	N.N.W.	98	1.0	14	11 A				
16	39.5	.456	55.0	S.	144	1.0	14	12 M				
17	44 5	.570	53.5	S.S.W.	73	0 0	—	—				
18	49.5	.588	61.5	S.S.W.	130	1.5	17	6 P				
19	58.0	.622	78.5	S.S.W.	228	3.5	26	3 P				
20	59 5	.673	76.0	S.S.W.	272	4.5	30	3 P				
21	62.5	.639	90.0	E.	94	0.0	—	—	5:30 A	10 A	.13	
22	57 0	.554	84 0	E.	57	0.0	—	—	1 A	5 A	.08	
23	55.5	.597	75 0	S.	139	3.0	24	2 P				
24	40 5	.496	51.5	S.W.	166	3 0	24	5 P				
25	55.0	.544	80.0	S	177	3.5	26	3 P	6:30 P	10 P	.43	
26	52.5	.607	66 5	E.S.E.	137	1.0	14	3 P				
27	61.0	.606	92.5	S.	149	2.0	20	6 A	2:30 A	3 A	.06	
28	65.0	.827	75.0	W.N.W.	135	3 5	26	2 P				
29	52.5	.480	82.0	S.S.E.	77	0.0	—	—	4 P	10 P	.04	
30	49.0	.415	83.0	S.S.E.	73	0.5	10	10 P	6 A	7 A	.03	
31	57.0	.524	87.5	S.S.W.	109	1.0	14	6 A	7 A	10 A	.01	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during May was generally seasonable and well adapted to plant growth. A large amount of sunshine and some high temperature, especially during the first part of the mouth, gave vegetation a good start on the season's growth. While the precipitation record was rather small, the ground seemed to be fairly well supplied with moisture for starting the crops. The entire absence of any frost during the month was an especially favorable feature.

The records of the several weather elements show the following features of interest: The mean barometer was considerably higher than the normal and the range was large for May. The maximum barometer was higher than usual while the minimum was about the normal value. The total wind movement was a little more than the normal and was from the south more than one-half the time. Only a few gales were recorded and they were of little intensity.

The mean temperature wns more than four degrees above the normal and the minimum fell below 40 degrees on only three dates. While frost was reported on a few dates in low places, there was none noted at the station. The maximum temperature was practically normal.

The mean dew point and relative humidity were both higher than their average values. The total precipitation was more than an inch less than the normal amount. That which occurred, however, was fairly well distributed throughout the month.

The amount of sunshine was large, but the last week was rather cloudy.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

NOTE—The regular observations at this station are continued at 8 A. M. and 8 P. M. *75th meridian time.*

BULLETIN No. 354. JUNE, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.94, 20th, 8 A
Minimum reduced to freezing,	29.02, 12th, 3 P
Reduced maximum reading	30.24, 20th, 8 A
Reduced† minimum reading,	29.31, 12th, 3 P
Mean semi-daily reduced	29.920
Monthly range	0.93

***Air Temperature.** In Degrees Fahr.

Highest	93.0, 1st, 3:30 P.
Lowest	40.0, 20th, 5 A; 21st, 5:30 A
Mean hourly	62.9
Mean of means of max. and min.	63.0
Mean sensible (wet bulb)	57.3
Monthly range	53 0
Highest mean daily	79.8, 2d
Lowest mean daily	51.2, 23d
Mean maximum	75.0
Mean minimum	51.0
Mean daily range	24.0
Greatest daily range	41.0, 16th
Least daily range	6.0, 23d

Humidity.

Mean dew point	53.3
Mean force of vapor	.581
Mean relative humidity	72.9

Precipitation. In inches.

Total precipitation, in inches	4.01
Number of days on which .01 inch or more rain fell	9

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3858 m
Greatest daily movement	332m, 7th
Least daily movement	24m, 25th
Mean daily movement	129 m
Mean hourly velocity	5.4 m

Maximum pressure per square foot, 4.5 lbs = 30m per hour, 3d, 6 P, N.W.; 7th, 5:30 P, S.

Maximum velocity for 5 minutes, 24m per hour, 3d, 6 P, N.W.

Prevailing direction, West Southwest.

Summary.

South	23 per cent
Northwest	13 " "
South Southwest	13 " "
West	10 " "
North Northwest	10 " "
Other directions	31 " "

Weather.

Mean cloudiness observed	45 per cent
Total cloudiness recorded by the Sun Thermometer	192 hours = 42 per cent
Number of clear days	9
Number of fair days	13
Number of cloudy days	8

Bright Sunshine.

Number hours recorded, 265 hrs, = 58 per cent

Rain, 4th, 6th, 7th, 9th, 10th, 12th, 13th, 17th, 21st, 22d, 23d.

Thunder and Lightning, 6th, 12th.

Gales, 35 miles or more per hour: None

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.89	29.72	29.789	93.0	3:30 P	60.0	5 A	77.5	76 7	69.3	10.3
2	29 92	29.77	29 875	89.0	3:30 P	68.0	11:30 P	78.5	79.8	69.7	12.1
3	30.03	29.92	29 972	81.0	4 P	62.0	5:30 A	71.5	72.4	64.3	13 0
4	30.17	30.03	30.171	78.5	2 P	52.0	5:30 A	65.3	63.5	56.7	9.7
5	30.20	30.13	30.195	77.5	3 P	51.0	6 A	64.3	63 9	58 3	11.0
6	30.20	29.98	30.119	72.0	0:30 P	58.0	5 A	65.0	65.7	62.5	2.7
7	29.98	29 67	29.768	70.5	2 P	57.0	12 P	63.7	65 8	57.0	7.0
8	30.06	29 90	30 031	73 5	4 P	50.0	4 A	61.7	59.9	53.5	12.4
9	30.07	29 97	30.022	77 0	1 P	45.0	3 A	61.0	62.8	57.5	7.5
10	30.03	29.94	29 971	68.0	1 P	54.0	12 P	61 0	60.6	57.7	2.9
11	30.03	29 71	29.898	75 5	1:30 P	54.0	0:30 A	63.7	62.5	57.5	10.5
12	29.71	29.31	29.425	73.0	2 P	55.5	1 A	64.3	61.9	57.7	0.9
13	29.67	29.46	29 559	64.0	6 P	52.0	12 P	58.0	57.1	51.7	4.3
14	29.84	29.67	29 719	72.0	3 P	48 5	3:30 A	60.3	60.2	54.5	10.7
15	30.13	29.84	29.957	74.0	4 P	44.0	5 A	59.0	61.3	58.5	13.5
16	30.20	30 09	30.155	82 0	5 P	41.0	5:30 A	61.5	63.7	59.0	13.5
17	30.10	29 87	29.962	82.0	1 P	53.5	5 A	67.7	67.6	60.7	9.0
18	30.00	29.93	29.988	76.5	3 P	50.0	12 P	63.3	64.1	53.3	13.5
19	30.18	29.97	30.074	74.5	3 P	42.0	5 A	58.3	58 0	49.3	10.7
20	30.24	30.14	30.199	70.0	4:30 P	40.0	5 A	55.0	55.8	47.3	13.0
21	30.21	29.82	30.050	69 0	3:30 P	40.0	5:30 A	54.5	55.2	50.3	11.5
22	29 82	29 42	29.451	64 0	6 P	52.0	0 A	58.0	57.2	55.0	3 1
23	29.68	29 43	29 565	55 0	2 P	49 0	12 P	52 0	51.2	48.0	2.6
24	29.94	29.68	29 825	74.0	3 P	46.5	3 A	60.3	60.6	58.5	9.8
25	29.97	29.92	29 946	77.0	3 P	47.0	5:30 A	62.0	61.3	57 5	7.5
26	30.08	29.96	29.994	77.0	2:30 P	49.0	6 A	63.0	63.6	57.3	12.5
27	30 08	30.05	30.067	74.0	3:30 P	48.0	5 A	61.0	61.2	54.7	12.7
28	30.10	29.95	30.030	72.0	3:30 P	45 0	5 A	58.5	59.2	55 7	3.0
29	29 97	29.90	29 943	74.5	3 P	57.0	4 A	65.7	63.6	60.3	6.0
30	30.03	29.74	29.885	89.0	3:30 P	60 0	5 A	74.5	71.5	66.5	7.8

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	67.5	.874	77.5	S.S.W.	100	1.0	14	3 P				
2	64.5	1 044	58.5	N.W.	179	2.0	20	2 P				
3	59.0	.808	62.5	W.	193	4.5	30	6 P				
4	53.0	.556	74.0	W.	113	3.5	26	0:30A	7:30 P	9 P	.02	
5	54.5	.584	73.0	S.	37	0.0	—	—				
6	60.0	.606	77.5	S.	66	2.5	22	11 P	1 P	3 P	.04	
7	52.0	.578	70.5	W.S.W.	332	4.5	30	5:30P	6 A	2 P	.69	
8	49.5	.493	71.5	N.	196	2.0	20	10 A				
9	53.5	.580	71.5	S.	42	0.5	10	12 M	7:30 P		T	
10	56 0	.526	85.5	N.N.E.	59	0.0	—	—	4 A	7:30 A	.06	
11	54.5	.555	76.5	N.W.	124	2.5	22	4 P				
12	56 0	.531	85.0	W.	248	2.5	22	11 A	5 A	12 P	.69	
13	48.5	.448	75.5	N.N.W.	196	2.0	20	10 A	11 P	12 P	T	
14	50.5	.520	71.5	S.W.	151	2.5	22	2 P				
15	53.5	.627	65.5	N.W.	122	2.0	20	1 P				
16	55.0	.608	71.0	S.	74	4.0	28	3 P				
17	56.0	.685	66.5	S.	200	2.5	22	2 P	8:30 P	9 P	.03	
18	45.5	.548	57.0	N.N.E.	135	1.0	14	9 A				
19	40.0	.495	51.0	N.E.	115	1.5	17	8 A				
20	37.0	.455	49.5	S.	112	0.5	10	10 A				
21	45 0	.445	67.0	S.	167	4.0	28	6 P	7 P	12 P	.25	
22	53.5	.462	90 0	N.N.W.	104	1.0	14	8 P	0 A	10 A	2.18	
23	45.5	.362	85 0	N.W.	173	2.0	20	3 P	8:30 A	6 P	.05	
24	55 0	.575	76.5	N.N.W.	116	1.5	17	12 P				
25	55.5	.519	85.0	S.S.W.	24	0.0	—	—				
26	53.5	.552	75 0	E.S E.	85	0.5	10	4 P				
27	51.0	.512	74 0	N.E.	101	1.0	14	1 P				
28	53 5	.515	82 0	S.E.	62	1 0	14	3 P				
29	58.5	.585	83.5	S.S.W.	174	2.0	20	4 P				
30	63.5	.786	77.0	S.S.W.	59	0.5	10	4 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The effect of the weather during June on growing crops was somewhat disappointing. While the amount of sunshine was ample, the temperature was considerably below the normal. The first three days were the warmest of the month, and the last third of the month was the coolest period. The month was too dry for vegetation up to the 22d when a very heavy rainfall was recorded, which materially improved the moisture in the soil.

A summary of the various weather features shows the following features of more or less interest: The mean barometer was below the normal and the range of pressure was larger than usual. Although there were two periods of low barometer, the total wind movement was but little more than the normal and not a single gale was registered on the wind pressure chart. Most of the wind was from the westerly points of the compass.

The mean temperature was three degrees below the normal, and only four days had a mean hourly temperature above 70 degrees. The maximum temperature was slightly higher than the normal and occurred on the first day of the month. The minimum temperature was practically normal and no frost was noted at this station. The minimum thermometer however registered below 50 degrees on nearly one half the days of the month.

The mean dew point was more than three degrees lower than usual, and the relative humidity was practically normal.

The total precipitation was nearly one-fourth more than usual, due to the storm of the 22d. The other rains of the month were mostly of but small amounts.

The amount of cloudiness was less than usual.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Acting Observer.

BULLETIN No. 355. JULY, 1918

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.93, 25th, 8 A
Minimum reduced to freezing,	29.40, 9th, 1 P
Reduced maximum reading . .	30.22, 25th, 8 A
Reduced† minimum reading, .	29.69, 9th, 1 P
Mean semi-daily reduced	29.967
Monthly range	0.53

***Air Temperature.** In Degrees Fahr.

Highest	99.5, 22d, 5 P.
Lowest	45.0, 3d, 5 A.
Mean hourly	70.1
Mean of means of max. and min.	71.1
Mean sensible (wet bulb)	64.3
Monthly range	54.5
Highest mean daily	81.2, 23d
Lowest mean daily	62.0, 2d
Mean maximum	83.4
Mean minimum	58.8
Mean daily range	24.6
Greatest daily range	38.5, 22d
Least daily range	12.0, 1st

Humidity.

Mean dew point	60.5
Mean force of vapor	.737
Mean relative humidity	74.5

Precipitation. In inches.

Total precipitation, in inches	1.84
Number of days on which .01 inch or more rain fell	6

Wind.

Total movement	3093 m
Greatest daily movement	240m, 30th
Least daily movement	18m, 19th
Mean daily movement	100 m
Mean hourly velocity	4.2 m

Maximum pressure per square foot, 5.0 lbs = 32m per hour, 29th, 6 P, S.S.W.

Maximum velocity for 5 minutes, 24m per hour, 29th, 6 P, S.S.W.

Prevailing direction, Southwest.

Summary.

South	16 per cent.
North	16 " "
South Southwest	16 " "
Southwest	10 " "
North Northeast	10 " "
Other directions	32 " "

Weather.

Mean cloudiness observed	44 per cent
Total cloudiness recorded by the Sun Thermometer . .	176 hours = 38 per cent
Number of clear days	7
Number of fair days	19
Number of cloudy days	5

Bright Sunshine.

Number hours recorded, 286 hrs, = 62 per cent

Rain, 1st, 4th, 6th, 9th, 10th, 13th, 17th, 30th.

Thunder and Lightning, 10th, 14th, 15th, 17th, 30th.

Gales, 35 miles or more per hour : None

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.95	29.80	29.828	76.0	0:30 P	64.0	5 A	70.0	68.0	65.0	1.9
2	30 02	29.82	29 910	71.0	3 P	51.0	12 P	61.0	62.0	55.0	10.2
3	30.09	30.02	30.081	81.0	6 P	45.0	5 A	63.0	63.1	53 5	13 0
4	30.14	30.06	30.100	83.0	4 P	56.0	2 A	69.5	68.6	60.7	10.2
5	30.10	29.92	29.990	84.0	2 P	61.0	5:30 A	72.5	72.1	64 7	12.0
6	29.96	29.83	29.875	73.5	4:30 P	60.0	12 P	66.7	66.5	64.7	7.9
7	29.86	29.73	29.770	77.0	3:30 P	57.0	12 P	67.0	66.2	59.7	10.6
8	29.80	29 72	29.754	70.0	4 P	52.0	5 A	61.0	60.7	55.5	9.0
9	29.75	29.69	29.722	72.0	12 M	52.0	5 A	62.0	60.6	57 5	4.4
10	29.94	29.75	29.868	79.5	2:30 P	56 0	5 A	67.7	67.1	62.5	9.0
11	29.99	29.91	29.954	81.5	4 P	51.0	5:30 A	66.3	67.5	61.7	10.2
12	30.01	29.95	30 002	80.0	4 P	56.0	5 A	68.0	68.0	62.3	12.2
13	30.03	29.96	30 027	78.0	5 P	56.0	5 A	67.0	65.3	62.5	6.2
14	29 98	29.90	29.974	77.5	4 P	57.0	12 P	67.3	65.4	61.7	3.6
15	30.05	29.94	29.978	85.0	5:30 P	53.0	4 A	69.0	67.7	65.7	10.0
16	30.04	29 90	29.986	90.5	2:30 P	53.0	5 A	71.7	71.5	60.5	11.5
17	29.90	29 77	29.817	80.0	11:30 A	62.0	5 A	71.0	67.7	65.3	4.7
18	29.85	29.77	29.792	84.5	5 P	61.5	5 A	73.0	72.2	68.7	12.5
19	29.91	29 83	29.868	89.0	3 P	56.5	5:30 A	72.7	71.8	65.0	11.0
20	30.06	29.91	29.984	90.0	4 P	59.0	5 A	74.5	73.3	64 7	12.5
21	30.12	30 06	30.095	95.5	3:30 P	57.5	5 A	76.5	74 6	65.7	12.7
22	30.15	30.07	30.118	99.5	5 P	61.0	6 A	80.3	80.0	68 7	12.0
23	30.10	29.97	30 042	96.0	2:30 P	66 5	5 A	81.3	81.2	73.0	11.8
24	30.19	30.04	30.136	84.0	2 P	67.0	5 A	75.5	74.3	67.3	7.0
25	30.22	30.16	30 203	83.0	3:30 P	65 0	2 A	74.0	71.3	66 0	9.5
26	30.21	30.11	30.163	87.0	3 P	66.0	4 A	76 5	74 4	68.3	9.5
27	30.15	30.03	30.098	94.0	3 P	65 0	5 A	79 5	77 9	70.0	11.5
28	30.08	30.00	30.041	96.5	3 P	68.5	5 A	82.5	80.6	74.5	11.5
29	30.04	29.90	29.977	91.0	3 P	68.0	4 A	79.5	78.2	71.7	9.0
30	29.91	29.87	29.888	79.0	9 A	63 0	12 P	71.0	70.0	66.7	0.6
31	29.95	29.90	29.925	76.5	3:30 P	57.0	5 A	66.7	65.8	66.0	8.7

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	63.0	.679	85.0	S.S.W.	189	2.5	22	1 P	2 P	5:30 P	.11	
2	51.0	.521	73.0	N.N.W.	123	1.5	17	5 P				
3	45 5	.581	53 0	N.	65	0.0	—	—				
4	55.0	.700	62.5	N.N.E.	97	1.0	14	1 A	1:30 A	2:30 A	T	
5	58.5	.838	60.5	N.N.E.	146	1.5	17	10 A				
6	61.5	.707	79 5	E.	90	0.0	—	—	0:30 P	1:30 P	T	
7	55.0	.660	71.0	N.W.	114	2.0	20	1 P				
8	52.0	.525	74.3	W.N.W.	139	1.5	17	5 P				
9	55.0	.557	78.0	S.S.W.	100	2.0	20	11 A	7 P	8 P	.02	
10	59.5	.662	78.5	S.	127	1.5	17	3 P	5 P	6 P	.01	
11	57.5	.694	69.5	S.W.	53	0 0	—	—				
12	59 0	.698	72.0	N.	74	0.5	10	1 P				
13	61.0	.612	88.5	N.	52	0.0	—	—	5 P	6 P	.04	
14	60.5	.583	91.0	N.	28	0.5	10	1 P				
15	64.5	.715	86.5	S.E.	39	0.0	—	—				
16	56 0	.672	67.0	S.	87	1.0	14	6 P				
17	63.5	.676	88.0	N.NE.	76	0.5	10	1 P	2 P	5 P	.21	
18	67.0	.798	83.5	N.W.	78	0.0	—	—				
19	61.5	.742	75.5	S.W.	18	0.0	—	—				
20	61.0	.785	67.5	N.N.W.	67	0.0	—	—				
21	62.5	.763	74.5	W.S W.	40	0.0	—	—				
22	63.5	1.002	60 5	S.S.W.	21	0.0	—	—				
23	69.5	1.035	70.0	S.W.	61	0.0	—	—				
24	64 0	.807	75.0	E.S.E.	85	0 0	—	—				
25	64.0	.718	84.5	S.S.E.	53	0.0	—	—				
26	65.5	.801	80 5	S.	123	0.5	10	3 P				
27	67.5	.820	78.5	S.	162	2.5	22	1 P				
28	71.5	1.130	70.5	S.S.W.	162	2.5	22	7 P				
29	68.5	.952	75 0	S.	233	5.0	32	6 P				
30	64 0	.803	76.5	S.S W.	240	3 0	24	6 A	9:30 A	5:30 P	1.45	
31	49.0	.603	58.5	N.	151	1.5	17	9 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The most noticeable features of the weather during July were the very light precipitation up to nearly the end of the month, and the large amount of sunshine. The drought, which had become quite pronounced, was broken on the 30th by a heavy shower, giving nearly one and one-half inches of water, and about eighty per cent of the total for the month.

The first half of the month was much cooler than the last half, when several very warm days occurred.

A comparison of the records of the several weather elements with their respective normals shows the following features of more or less interest. The mean barometer was practically normal and the range of pressure comparatively small. The total wind movement was about eighty per cent of the normal and many days of comparative calm were noted. More than the usual amount of wind was from the southerly points of the compass.

The mean temperature was practically normal and the range considerably more than the normal. The maximum temperature was about six degrees higher than the normal, and the minimum was about the average value for this feature. The difference between the mean hourly temperature and the mean of maximum and minimum temperatures was larger than usual.

The mean dew point was slightly below the normal and the mean relative humidity about a point higher than usual.

The total precipitation was about forty per cent of the normal and nearly all came in a single storm as noted above.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Acting Observer.

BULLETIN No. 356. AUGUST, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.,19 19th, 9 A
Minimum reduced to freezing,	29.44, 9th, 4 P
Reduced maximum reading	. . 30.48, 19th, 9 A
Reduced† minimum reading,	. 29.72, 9th, 4 P
Mean semi-daily reduced	. . . . . 30.027
Monthly range	. . . . . 0.76

***Air Temperature.** In Degrees Fahr.

Highest	. . . . . 100.0, 7th, 3 P.
Lowest	. . . . . 44.0, 19th, 6 A.: 20th, 6 A.
Mean hourly	. . . . . 70.5
Mean of means of max. and min.	. . . . 71.6
Mean sensible (wet bulb)	. . . . . 63.9
Monthly range	. . . . . 56 0
Highest mean daily	. . . . . 81.7, 7th
Lowest mean daily	. . . . . 60.9, 19th
Mean maximum	. . . . . 84.5
Mean minimum	. . . . . 58.7
Mean daily range	. . . . . 25.8
Greatest daily range	. . . . . 42.5, 20th
Least daily range	. . . . . 13.0, 29th

Humidity.

Mean dew point	. . . . . 60.8
Mean force of vapor	724
Mean relative humidity	. . . . . 75.5

Precipitation. In inches.

Total precipitation, in inches	. . . . . 2.22
Number of days on which .01 inch or more rain fell	 10

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	. . . . . 2583m
Greatest daily movement	. . . . . 145m, 17th
Least daily movement	. . . . . 24m, 16th
Mean daily movement	. . . . . 83 m
Mean hourly velocity	. . . . . 3.5 m
Maximum pressure per square foot, 6.5 lbs = 36m per hour, 14th, 3 P, S.W.	
Maximum velocity for 5 minutes, 24m per hour, 14th, 3:30 P, S.W.	
Prevailing direction, South.	

Summary.

South	. . . . . 39 per cent.
South Southwest	. . . . . 19 " "
Southwest	. . . . . 10 " "
North Northeast	. . . . . 10 " "
Other directions	. . . . . 22 " "

Weather.

Mean cloudiness observed	. . . . 37 per cent
Total cloudiness recorded by the Sun Thermometer	. . 153 hours = 36 per cent
Number of clear days	 12
Number of fair days	 12
Number of cloudy days	 7

Bright Sunshine.

Number hours recorded, 276 hrs. = 64 per cent

Rain. 5th, 7th, 9th, 10th, 11th, 14th, 24th, 26th; 29th, 31st.

Thunder and Lightning. 2d, 9th, 14th, 24th, 26th, 31st.

Gales. 35 miles or more per hour : 36 m, 14th, S. W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.00	29.92	29.967	84.0	4:30 P	58.0	5:30 A	71.0	70.0	58.7	11.5
2	29.98	29.82	29 908	85.5	2:30 P	58.0	4 A	71.7	71.2	65.3	8.4
3	30.09	29.87	30.004	78.0	3:30 P	54.5	12 P	66.3	66.7	57.3	12.7
4	30.13	30.03	30 070	76.0	3 P	50.5	3 A	63.3	63.3	58.3	6.5
5	30.03	29.78	29.857	86.0	5 P	59.0	3 A	72.5	70.4	67.3	6.7
6	29.90	29.83	29.886	96.0	3:30 P	69.0	6 A	82.5	80.4	72.5	10.7
7	29 98	29 81	29.844	100.0	3 P	68.5	5:30 A	84.3	81.7	71.3	10.2
8	29.87	29 83	29.853	86.5	5 P	72.5	5 A	79.5	79.5	72.0	6.3
9	29.94	29 72	29 780	80.5	3:30 P	66.0	12 P	73.3	73 1	67.5	4.8
10	30.15	29.94	30.117	79.0	1 P	59.0	12 P	69.0	64.7	61.3	2.1
11	30.12	30.01	30 068	71.0	3 P	57.0	5:30 A	64.0	63.9	63.0	5.2
12	30.03	29.97	30 000	87.5	5 P	67.0	5 A	77.3	75.3	71.7	8.3
13	30.05	29.91	29.995	93.0	3 P	59.5	6 A	76.3	77.2	71.3	11.0
14	29.93	29.77	29.894	95.0	2:30 P	70.0	12 P	82.5	79 4	71.7	7.9
15	30.04	29.90	30.024	84.5	4 P	58.0	6 A	71.3	70.5	61.7	12.8
16	30.02	29.92	29.975	87.0	3 P	52.5	5 A	69.7	68.9	61.3	11.3
17	30.27	30.01	30.136	74.5	4 P	52.5	6 A	63 5	64 9	60.0	12.5
18	30.40	30.27	30.322	77.0	5 P	47.5	6 A	61.7	61.3	52.5	11.8
19	30.48	30.33	30.409	78.5	5:30 P	44.0	6 A	61.3	60.9	53.0	12.7
20	30.38	30.22	30.298	86.5	4:30 P	44.0	6 A	65.3	64.5	55.3	12.1
21	30.24	30 01	30.115	87.0	4 P	48.0	6 A	67.5	68.0	60.3	11.8
22	30.07	29 94	29.983	92.5	4 P	63 0	6 A	77.7	76.5	67.7	11.0
23	30.04	29.92	29.985	95.0	4 P	59.5	3:30 A	77.3	75.1	68.3	8.7
24	29.98	29.89	29.945	84.0	2:30 P	66.5	6 A	75.3	73.4	68.5	5.3
25	29.97	29 89	29 938	93 0	3 P	66.0	5 A	79.5	76.5	69.0	10.0
26	29.91	29.77	29.868	86.0	1 P	67.0	11 P	76.5	73.5	68.7	3.0
27	30.29	29 86	30.178	82.0	3 P	55.0	12 P	68.5	68.5	56.7	12.1
28	30.41	30.30	30.374	80.0	3 P	46.0	6 A	63.0	62.8	56.0	11.5
29	30.30	29.99	30.059	69.0	4 P	56 0	0 A	62.5	63.8	63 3	0.8
30	30.06	29.98	30.018	82 5	4 P	59 0	6 A	70 7	70.2	64.3	11.3
31	30.06	29.85	29.969	82 0	3 P	65 5	5:30 A	73.7	70.1	65.7	5.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	54.0	.637	64.5	S.S.W.	73	1.0	14	9 P				
2	63.5	.732	79.0	S.	122	2.0	20	1 P				
3	51.0	.638	58.0	N.N.E.	135	1.0	14	9 P				
4	49 5	.566	62.5	S.S.W.	116	3.0	24	2 P				
5	66.5	.739	89.5	S.	77	1.5	17	0 A	1 A	3 A	.02	
6	70.5	.954	78.5	S.W.	33	0.0	—	—				
7	69 5	.949	75.0	S.W.	83	2.0	20	4 P	5:30 A	7:30 A	.06	
8	69.0	.999	71.5	W.	58	0.5	10	3 P				
9	66.5	.756	84.5	E.	72	0.5	10	5 P	4 A	2:30 P	.26	
10	60.0	.588	87.5	E.	86	0.5	10	1 A	7:30 P	12 P	.32	
11	62.5	.614	92.5	S.	29	0.0	—	—	0 A	3:30 A	.16	
12	71.0	.850	89.5	S.	63	0.0	—	—				
13	70.0	.901	80.5	S.	80	1.5	17	4 P				
14	70.5	.975	79.5	S.	124	6.5	36	3 P	3:30 P	5 P	.39	
15	57.5	.714	67.0	S.E.	68	0.5	10	6 P				
16	58.0	.658	73.5	S.S.W.	24	0.0	—	—				
17	54.5	.711	61.0	N.N.E.	145	2.0	20	12 M				
18	45.0	.538	56.0	N E.	92	0.0	—	—				
19	47 0	.519	63.5	N.	58	0.0	—	—				
20	50.0	.571	64.0	S	39	0.0	—	—				
21	57.0	.650	75.0	S W.	95	1.5	17	2 P				
22	63.0	.893	66.5	S.	98	1.0	14	3 P				
23	66.5	.720	84.0	S.S.W.	91	1.5	17	6 P				
24	66.5	.810	79.5	S.	144	2.0	20	2 P	2 P	6 P	.05	
25	65.5	.835	74.0	S.S.W.	40	1.0	14	5 P				
26	67.5	.765	88.0	S.	68	2.0	20	3 P	5:30 A	2 P	.06	
27	53.5	.598	68.0	N.N.E.	119	2.5	22	8 A				
28	51.5	.535	73 0	S.S.W.	107	2.5	22	5 P				
29	62.5	.615	92.0	S.	67	0.0	—	—	7:30 A	2 P	.49	
30	61 0	.714	75.0	N.N.W.	44	0.0	—	—				
31	64.5	.703	87.0	S.	133	3.5	26	3 P	3 P	12 P	.41	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during August was warmer than usual, the maximum daily temperature being above 80 degrees on more than three-fourths of the days, and above 90 degrees on seven days. Although high temperatures were frequent the relative humidity was below the normal, making the heat less oppressive. The month was much drier than shown by the precipitation record, owing to the fact that nearly one-half the total rainfall occurred when the month was nearly over. The total precipitation was far from adequate, following the dry weather of the previous month. The prevalence of south wind was very unusual for this locality.

The records of the several weather elements show the following as the most important features of the records for the month. The mean barometer was slightly higher than the normal and the range more than usual. The maximum and minimum pressures were both higher than their respective normals. The total wind movement was about 600 miles less than the average and only one gale was recorded on the pressure chart.

The mean hourly temperature was more than two degrees above the normal and the maximum temperature of 100 degrees makes a new high record for August at this station. The maximum was nearly ten degrees above the normal value for this station. The minimum temperature was slightly higher than the normal, and was recorded on two successive mornings.

The mean dew point was slightly higher than the normal and the relative humidity about a point lower than usual.

The total precipitation was but little more than one-half the usual amount. While rain fell on ten dates most of the storms were of but little account.

The amount of bright sunshine was unusually large and the number of cloudy days small.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Acting Observer.

BULLETIN No. 357. SEPTEMBER, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.,12 11th, 8 A
Minimum reduced to freezing,	29.40, 28th, 4 P
Reduced maximum reading	30.42, 11th, 8 A
Reduced† minimum reading,	29.69, 28th, 4 P
Mean semi-daily reduced	30.029
Monthly range	0.73

***Air Temperature.** In Degrees Fahr.

Highest	84.0, 4th, 4 P.
Lowest	34.5, 30th, 6 A.
Mean hourly	57.6
Mean of means of max. and min.	58.0
Mean sensible (wet bulb)	53.2
Monthly range	48 5
Highest mean daily	71.6, 5th
Lowest mean daily	47.8, 27th
Mean maximum	69.1
Mean minimum	46.9
Mean daily range	22.2
Greatest daily range	38.0, 15th
Least daily range	5.5, 26th

Humidity.

Mean dew point	50.3
Mean force of vapor	.470
Mean relative humidity	81.3

Precipitation. In inches.

Total precipitation, in inches	7.00
Number of days on which .01 inch or more rain fell	15

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3271m
Greatest daily movement	224m, 28th
Least daily movement	30m, 15th
Mean daily movement	109 m
Mean hourly velocity	4.5 m
Maximum pressure per square foot, 4.5 lbs = 30m per hour, 27th, 2 P, W.	
Maximum velocity for 5 minutes, 24m per hour, 28th, 1:30 P, S.	
Prevailing direction, West Southwest.	

Summary.

South	13 per cent.
South Southwest	20 " "
West	17 " "
North	10 " "
Southwest	10 " "
North Northwest	13 " "
Other directions	17 " "

Weather.

Mean cloudiness observed	56 per cent
Total cloudiness recorded by the Sun Thermometer	186 hours = 50 per cent
Number of clear days	7
Number of fair days	12
Number of cloudy days	11

Bright Sunshine.

Number hours recorded, 187 hrs, = 50 per cent

Rain, 1st, 6th, 7th, 8th, 9th, 12th, 13th, 17th, 18th, 20th, 21st, 23d, 26th, 27th, 30th.

Thunder and Lightning, 1st, 18th, 22d.

Frosts, 11th, 22d, 30th.

Gales, 35 miles or more per hour: None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.13	29 86	30.019	79.5	4 P	56.0	12 P	67.7	67 1	59.5	11.1
2	30.23	30.13	30.202	81.0	4 P	48.0	6 A	64.5	65.1	59.7	11.7
3	30.20	30.11	30.154	78.0	4 P	53.0	6 A	65.5	63.6	58.3	10.0
4	30.15	30.06	30.110	84.0	4 P	58.5	6 A	71.3	69.5	64 5	8.1
5	30.08	29.85	29 929	82.0	3 P	65.5	4 A	73.7	71.6	65.5	8.1
6	29.89	29.84	29.824	72.0	3 P	56.0	12 P	64.0	65.1	61.7	1.4
7	30.12	29.88	30 053	67.5	4 P	48.0	4 A	57.7	56.0	51.0	6 2
8	30.16	30.09	30.131	61.5	3 P	48.0	3 A	54.7	54.7	53.5	1.1
9	30.20	30.11	30.173	76.5	4 P	52.0	6 A	64.3	62 3	57.0	11.0
10	30.34	30.15	30.236	72.5	3:30 P	47.0	12 P	59.7	60.2	52.3	9.3
11	30.42	30.23	30.344	68.0	5 P	36.5	6 A	52.3	52.4	46.7	11.4
12	30.26	30.05	30.146	69.0	3 P	48.5	2 A	58.7	56.7	52.0	5.5
13	30.05	29.86	29 888	69.0	5 P	53 0	12 P	61.0	57.7	55.7	3.0
14	30.00	29.90	29.962	65.5	2 P	45.5	6 A	55.5	55.5	51.5	6.0
15	30.03	29.91	29.990	77.0	4 P	39.0	7 A	58.0	56.7	47.3	10.0
16	30.00	29 94	29.984	72.0	1:30 P	50.0	6 A	61.0	62.0	57.7	1.5
17	30.09	29.92	30.010	75.5	1 P	52.0	12 P	63.7	64 6	60.0	2.5
18	30.10	29 78	29.936	53.5	6 P	47.0	3:30 A	50.3	51.6	50.5	0.0
19	29 97	29 84	29.955	77 0	3 P	52.5	2 A	64 7	62.8	57.7	7.4
20	29.95	29.88	29.856	70.0	11:30 A	50 0	12 P	60.0	61.2	59.7	2.0
21	30.08	29 83	29.962	61.0	6 P	45.0	8 A	53.0	50.5	45.5	6.3
22	30.25	30.08	30.239	59.0	3 P	37.0	7 A	48.0	48.7	45.3	7.0
23	30.29	30.18	30 244	66.5	3 P	41.0	7 A	53.7	54.0	50.5	8.7
24	30.18	30.02	30 090	63 0	4 P	43.0	12 P	53.0	52.0	49.0	2.2
25	30 22	30.10	30.164	61.0	3 P	35.5	6 A	48.3	48.0	45.7	4.3
26	30.10	29.85	29.926	53.5	0 A	48.0	12 P	50.7	51.1	50.5	0.0
27	29.95	29.87	29.920	59.0	3 P	37.0	6 A	48.0	47.8	42.3	4.5
28	29.93	29.69	29.812	72.0	3 P	39 5	4:30 A	55.7	56.1	50.0	9.6
29	29.96	29 72	29 794	65.0	3:30 P	41.0	12 P	53.0	54.6	49 3	9.5
30	30.20	29.96	30.135	63.0	3 P	34 5	6 A	48.7	50.0	47 0	7.3

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	56.0	.620	75.0	N.N.W.	149	2.0	20	9 A	0 A	3 A	.30	
2	56.5	.664	76.0	S.S.W.	44	0.0	—	—				
3	55.5	.546	79.0	S.	85	1.0	14	3 P				
4	63.5	.655	87.5	S.S.W.	67	0.5	10	2 P				
5	63.5	.693	81.5	S.S.W.	175	3 5	26	10 A				
6	60.0	.615	83.0	N.W.	113	0.0	—	—	8 A	1 P	.23	
7	47.5	.417	77.5	N.	99	1.0	14	10 A	12 M	1 P	.03	
8	51.5	.438	86.5	N.N.E.	82	0.5	10	1 P	10 A	12 P	.31	
9	54.5	.552	81.0	N.	93	0.5	10	1 P	0 A	1 A	.03	
10	48.5	.453	75.5	W.	130	2.0	20	3 P				
11	40.5	.390	65.5	S.S.W.	97	0.5	10	2 P				
12	50.0	.424	86.0	E.S.E.	91	0.5	10	12 M	7 P	12 P	.26	
13	55.0	.465	92.5	N.N.W.	80	0.0	—	—	0 A	9 A	.41	
14	48.5	.436	78.0	W.	87	1.0	14	1 P				
15	43 0	.406	73.0	S.	30	0.0	—	—				
16	55.5	.551	80.5	S.	114	1.5	17	2 P				
17	57.5	.585	82.5	W.	191	1.5	17	2 A	4:30 A	6 A	.02	
18	49.5	.383	93.5	N.	70	0.0	—	—	7 A	6 P	.66	
19	56.5	.527	88.5	S.S.E.	163	3.0	24	3 P				
20	59 0	.531	97.5	N.N.W.	80	0.5	10	11 P	4:30 A	12 P	.87	
21	42.5	.338	81.5	N.W.	154	2.0	20	12 M	0 A	6 A	.27	
22	35.0	.359	70.0	W.	92	2.5	22	3 P				
23	47.5	.430	77.5	S.W.	104	1.0	14	11 A	2 A	4 A	.13	
24	47.5	.365	91.5	S W.	75	1.0	14	4 P				
25	44.5	.337	90.5	S.S.W.	34	0.5	10	3 P				
26	49.5	.375	95.0	N.N.W.	92	1.0	14	8 P	1 A	12 P	3.17	
27	39.0	.298	80.0	S.W.	178	4.5	30	2 P	0 A	5 A	.20	
28	44.0	.452	64.5	S.	224	4.0	28	2 P				
29	45.0	.413	72.5	W.	170	2.5	22	12 M				
30	42.5	.372	75.0	S.S.W.	108	2.5	22	4 P	6 P	12 P	.11	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during September was less pleasant than usual owing to the large number of rainy days. The latter part of the month was comparatively cool, although freezing temperature was not reached at any time, and only a few light frosts were observed.

The total precipitation was unusually large, and the heavy storm of the 26th—27th showed a greater rainfail in 24 hours than had been noted for a number of years at this station. The observed cloudiness in the mornings was much greater than the amount noted in the evenings.

A comparison of the records of the several weather elements with their normals shows the following features of interest: The mean barometer was slightly lower than the normal and the range of pressure rather small. Change of pressure was generally slow. The maximum pressure for the month was practically normal, while the minimum was considerably higher than the normal.

The total wind movement was about the usual value and the wind directions were more variable than usual. Not a single gale was recorded on the pressure chart.

The maximum temperature came early in the month, and was not as high as the normal. The minimum temperature was registered on the last day of the month. The mean temperature was about three degrees below the normal, making it one of the coldest Septembers on our record.

The mean dew point was more than three degrees below the normal and the relative humidity about two points higher than usual, owing to the large amount of rainy weather.

The precipitation was about 70 per cent more than the normal and was well distributed throughout the month. The heavy downpour near the end of the month has been referred to above.

The amount of bright sunshine was considerably less than the usual amount.

J. E. OSTRANDER, Meteorologist.

E. M. BUFFUM, Acting Observer.

BULLETIN No. 358. OCTOBER, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.26, 19th, 8 A
Minimum reduced to freezing,	29.27, 13th, 4 P
Reduced maximum reading	30.57, 19th, 8 A
Reduced† minimum reading,	29.56, 13th, 4 P
Mean semi-daily reduced	30.118
Monthly range	1.01

***Air Temperature.** In Degrees Fahr.

Highest	78.5, 29th, 2 P.
Lowest	27.5, 23d, 7:30A
Mean hourly	52.6
Mean of means of max. and min.	53.1
Mean sensible (wet bulb)	47.8
Monthly range	51 0
Highest mean daily	67.2, 29th
Lowest mean daily	42.4, 19th
Mean maximum	65.2
Mean minimum	41.0
Mean daily range	24.2
Greatest daily range	41.5, 10th
Least daily range	8.5, 30th

Humidity.

Mean dew point	44.3
Mean force of vapor	.389
Mean relative humidity	80.5

Precipitation. In inches.

Total precipitation, in inches	1.32
Number of days on which .01 inch or more rain fell	10

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	4297 m
Greatest daily movement	312m, 31st
Least daily movement	21m, 23d
Mean daily movement	139 m
Mean hourly velocity	5.8 m
Maximum pressure per square foot, 10.5 lbs = 46m per hour, 20th, 4 P, S.	
Maximum velocity for 5 minutes, 30m per hour, 6th, 2 P, W.S.W.	
Prevailing direction, South Southwest.	

Summary.

South	32 per cent.
South Southwest	32 " "
Other directions	36 " "

Weather.

Mean cloudiness observed	52 per cent
Total cloudiness recorded by the Sun Thermometer	161 hours = 47 per cent
Number of clear days	8
Number of fair days	11
Number of cloudy days	12

Bright Sunshine.

Number hours recorded, 180 hrs, = 53 per cent

Rain, 2d, 3d, 5th, 6th, 12th, 20th, 26th, 28th, 30th, 31st.

Thunder and Lightning, 3d.

Frosts, 4th, 8th, 9th, 10th, 15th, 19th, 22d, 23d, 24th.

Gales, 35 miles or more per hour: 42 m, 6th, W.S.W.; 46 m, 20th, S

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.46	30.20	30.434	65.0	5 P	38.0	6:30 A	51.5	48.5	40.5	10.5
2	30.45	30.09	30.304	65.5	4 P	34.0	4 A	49.7	50.7	48.3	3.3
3	30 22	30.02	30.119	68.0	1:30 P	44.0	12 P	56.0	58.8	55.0	4.3
4	30.43	30.22	30.352	64.5	3:30 P	36.0	6:30 A	50.3	49.4	43.5	8.5
5	30.26	29.77	29 944	65.5	2 P	44.0	1 A	54.7	55.7	51.7	1.2
6	29.83	29.57	29.654	74.0	2 P	46 0	12 P	60 0	60.0	56 3	4.2
7	30.37	29 83	30.217	59.0	3:30 P	38.5	12 P	48.7	46.7	36.5	8.6
8	30.50	30 32	30.412	67.5	4 P	30.5	7 A	49.0	46.6	38.7	10.5
9	30.32	30.05	30.177	68.0	4 P	30.5	7 A	49 3	47.7	41.3	8.0
10	30.09	30.00	30 074	71.5	4 P	30.0	7 A	50.7	50.6	43.7	9.3
11	30.13	30 01	30.101	75.0	3 P	41.0	5 A	58.0	57 1	48.7	8.5
12	30.09	29.83	29.947	57.0	8 P	45.0	6 A	51.0	51.7	51.3	0.0
13	29.83	29.56	29.694	72.0	1:30 P	53 0	4 A	62 5	59.0	53 0	3.7
14	30 02	29.71	29 859	59.5	2:30 P	41.0	12 P	50.3	49.5	44.3	7.7
15	30.22	30.02	30.213	56.0	3 P	33.5	6:30 A	44 7	44.6	37.7	9 2
16	30.18	30.05	30.134	63.0	4 P	40.0	12 P	51.5	47.9	41.0	5.9
17	30.19	29.84	30.060	61.0	3 P	35.0	7 A	48.0	48.9	44.0	4.4
18	30.43	29.82	30.229	56.0	0 A	35.0	12 P	45.5	47.2	40.7	1.5
19	30.57	30.43	30.520	59.5	3 P	29.0	6:30 A	44.3	42.4	35.5	10.9
20	30 44	29.87	30.106	56.5	3 P	34.0	4 A	45.3	48.4	48.7	0.5
21	30.09	29 83	30.008	58.0	3:30 P	38.0	12 P	48.0	49.9	43.5	7.5
22	30.24	30.09	30.209	61.0	4 P	32.5	4 A	46.7	44 9	37.5	9.7
23	30.34	30 24	30.299	66.0	5 P	27.5	7:30 A	46.7	42.9	36.5	9.7
24	30.44	30.30	30.398	60.5	2:30 P	29 0	7 A	44.7	46.9	41.3	9.6
25	30.36	30.27	30.322	63.5	3 P	45.5	7 A	54.5	54.4	52.7	5.0
26	30 32	30.20	30.277	67.0	2:30 P	54.5	1 A	60.7	60.0	60.3	0.3
27	30.25	30.15	30.206	74 5	3 P	58 5	6 A	66.5	64.2	60.0	6.3
28	30.15	29.94	30.032	66.5	6 P	52.0	6 A	59.3	59.5	59 7	0.7
29	29 94	29.85	29.916	78.5	2 P	63.0	6 A	70 7	67 2	65.7	5.7
30	29.88	29.61	29.768	72.5	0:30 P	64.0	3 A	68.3	66.5	66 3	1.0
31	29.77	29.57	29.663	68.0	2:30 P	48.0	12 P	58.0	61 9	59.0	4.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	34.0	.299	67.5	N.W.	63	0.5	10	6 A				
2	46.0	.389	82.0	S.S.W.	111	3.0	24	6 P	4:30 P	12 P	.02	
3	55.5	.470	88.0	S.	176	3.0	24	3 P	0 A	5 A	.22	
4	38.5	.333	70.5	S.	74	1.0	14	2 P				
5	48.5	.450	77.5	S.S.W.	239	5.0	32	1 P	8 P	12 P	.06	
6	54.5	.487	86.0	S.S.W.	208	9 0	42	2 P	0 A	3 P	.29	
7	26.0	.271	54.5	N.	279	2.0	20	8 A				
8	31.5	.288	63.5	S.S.W.	57	0.0	—	—				
9	37.5	.302	78.5	S.	63	1.0	14	2 P				
10	41.0	.311	86.0	S.W.	27	0.0	—	—				
11	44.5	.408	72.5	S.S.W.	85	2.5	22	4 P				
12	50.0	.398	93.5	S.	24	0.0	—	—	8 A	6 P	.22	
13	50.5	.452	81.0	S.S.W.	170	2.5	22	4 P				
14	38.0	.354	66.5	W.S.W.	168	2.0	20	6 P				
15	29.5	.280	59.0	W.	149	1.5	17	12 M				
16	37 0	.288	78.0	S.	24	0.0	—	—				
17	42.0	.320	88.0	S.S.W.	54	0.0	—	—				
18	37.0	.287	78.0	N.N.E.	227	2 5	22	10 A				
19	32.5	.233	81.0	S.S.W.	57	0 5	10	1 P				
20	46.5	.374	89 0	S.	274	10.5	46	4 P	4 P	12 P	.20	
21	39 0	.328	75.0	N.W.	296	2.5	22	10 A				
22	28.5	.277	58.0	N.	143	1.0	14	10 A				
23	32.5	.243	77.5	S.S.W.	21	0.0	—	—				
24	38.5	.288	84.5	S.W.	47	0.0	—	—				
25	52.0	.414	96.5	S.S.E.	98	1.0	14	11 P				
26	59.5	.533	97.0	S.	125	0.5	10	4 P	6:30 A	10 A	.03	
27	58.5	.542	91.5	S.	139	1.5	17	2 P				
28	59.0	.544	95.5	S.S.W.	102	2.5	22	2 P	2:30 P	3 P	.01	
29	65 0	.655	95.0	S.	243	2.5	22	6 P				
30	66.0	.666	95.0	S.	242	5.0	32	11 P	9:30 P	12 P	.10	
31	57.5	.540	89.5	W.N.W.	312	5.0	32	1 A	0 A	6 A	.17	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during October was more seasonable than that of the preceding month, and in some respects more pleasant. The precipitation was small, the temperature rather high and the amount of sunshine fully up to the normal. The great preponderance of wind from the south undoubtedly caused the comparatively warm weather which was especially noticeable the last few days of the month. The last week was in fact the warmest part of the month. While several frosts were noted early in the month, the first killing frost of the season occurred on the 19th, a date much later than usual.

The records of the several weather elements show the following features of interest: The mean barometer was considerably higher than the normal and the range was less than usual for the time of year. The maximum pressure was practically normal and the minimum rather high. On only a few days was the mean barometer lower than 30 inches.

The total wind movement was slightly more than usual, although there were but two gales. For about two-thirds of the time the wind was from the south or south southwest.

The mean temperature was about two degrees higher than usual. The maximum temperature was practically normal, but came much later in the month than usual. The minimum temperature was more than four degrees higher than the normal for this feature.

The mean dew point and relative humidity were both considerably higher than their normals.

The total precipitation was about one-third the normal amount and all of it occurred in small storms.

The last week was rather cloudy, but the total amount of sunshine for the month was considerably more than the normal. The mild weather continued up to the close of the month.

J. E. OSTRANDER, Meteorologist.

H. BERMAN, Acting Observer.

BULLETIN No. 359. NOVEMBER, 1918

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.29, 6th, 9 A
Minimum reduced to freezing,	28.75, 18th, 9 P
Reduced maximum reading	30.60, 6th, 9 A
Reduced† minimum reading,	29.05, 18th, 9 P
Mean semi-daily reduced	30.023
Monthly range	1.55

***Air Temperature.** In Degrees Fahr.

Highest	62.5, 8th, 1:30 P
Lowest	15.5, 27th, 5 A
Mean hourly	39.4
Mean of means of max. and min.	40.0
Mean sensible (wet bulb)	35.6
Monthly range	47 0
Highest mean daily	56.6, 18th
Lowest mean daily	22.0, 26th
Mean maximum	48.6
Mean minimum	31.3
Mean daily range	17.3
Greatest daily range	31.5, 7th
Least daily range	3.5, 20th

Humidity.

Mean dew point	32.0
Mean force of vapor	.235
Mean relative humidity	81.3

Precipitation. In inches.

Total precipitation, in inches	2.87
Total snow, in inches	Trace
Number of days on which .01 inch or more rain fell	7

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3730 m
Greatest daily movement	297m, 23d
Least daily movement	24m, 17th
Mean daily movement	124 m
Mean hourly velocity	5.2 m

Maximum pressure per square foot, 6.0 lbs = 35m per hour, 18th, 6 A, S.S.W.

Maximum velocity for 5 minutes, 24m per hour, 30th, 1:30 P, W.

Prevailing direction, West.

Summary.

South	13 per cent.
West Southwest	17 " "
West Northwest	13 " "
North	10 " "
West	10 " "
Northwest	10 " "
North Northwest	10 " "
Other directions	17 " "

Weather.

Mean cloudiness observed	49 per cent
Total cloudiness recorded by the Sun Thermometer	185 hours = 63 per cent
Number of clear days	4
Number of fair days	9
Number of cloudy days	17

Bright Sunshine.

Number hours recorded, 108 hrs, = 37 per cent

Rain, 4th, 17th, 18th, 19th, 20th, 28th, 29th.

Snow, 4th, 30th.

Gales, 35 miles or more per hour 35 m 18th, S.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.99	29.77	29.896	54.0	2 P	39.0	12 P	46.5	45.4	40.3	4.5
2	30.19	29.99	30.131	49.5	2 P	33.0	7 A	41.3	41.8	39.0	3.3
3	30 30	30.19	30.285	52.0	4 P	31.0	7 A	41.5	40.7	35.7	5.5
4	30.25	30.09	30.166	41.5	1 P	29.0	3:30 A	35.3	36.8	35 7	0.0
5	30.44	30.12	30.342	50 0	3:30 P	36.0	12 P	43.0	40.6	37.7	4.7
6	30.60	30.44	30.560	49.5	4:30 P	28 5	7:30 A	39.0	36.0	37 0	7.4
7	30.46	30 17	30.293	53.0	0:30 P	21.5	6:30 A	37.3	38.6	34.0	7.0
8	30.35	30.17	30.285	62.5	1:30 P	34.5	3:30 A	48.5	44.4	38 0	8.3
9	30.36	30.11	30.290	49.0	3 P	34 5	6 A	41.7	43.5	43.7	0.0
10	30.30	30.02	30.143	54.5	12 M	32.0	12 P	43.3	46.0	44.0	7.0
11	30.43	30 30	30 426	49.0	2 P	26.0	12 P	37.5	35 2	30.3	9.0
12	30.44	30.23	30.371	51.0	1:30 P	21.0	6 A	36.0	32.1	26.0	8.3
13	30.23	29.89	30.067	41.0	4 P	23 0	4 A	32 0	32.9	32 5	0.0
14	30.12	29.87	29.978	48 0	1:30 P	27.5	7 A	37.7	36.3	29.7	3.7
15	30.18	30.09	30 170	57.5	2 P	28.0	3 A	42.7	42.4	38.3	1.0
16	30.25	30.18	30.252	58 5	2 P	39.5	7 A	49.0	48.2	42.5	3 0
17	30.23	29 68	29.992	49 0	8 P	42.0	4 A	45.5	45 0	45.3	0.0
18	29.68	29.05	29.231	61.5	3 P	46.5	0 A	54 0	56.6	56.7	0.0
19	29.49	29 19	29.377	52.0	4 P	45.0	8 A	48.5	48 3	44 7	0.3
20	29 75	29.49	29 648	46.5	0 A	43.0	1 P	44.7	44.3	43.3	0.0
21	29.93	29 75	29 900	44.0	3 P	36.0	12 P	40.0	41.6	37.5	0.0
22	29.99	29 90	29.968	43.0	1:30 P	28.5	6 A	35.7	35 2	31.3	1.2
23	29.99	29 92	29.965	41.0	1:30 P	31.5	8 A	36.3	34.8	29.0	5.0
24	29.98	29.74	29.855	47.0	2 P	30 0	6:30 A	38.5	36.8	30 0	6.5
25	29.84	29.71	29 760	43 0	1 P	27.5	4 A	35.3	35.4	32.0	7.2
26	30.18	29.84	30.122	35.0	0 A	16 0	7 A	25.5	22.0	15.3	8.9
27	30.06	29.89	29.964	40 0	4 P	15 5	5 A	27 7	27.0	22.3	0.8
28	30.14	29.54	30.002	43.0	12 P	23.5	7 A	33.3	34.1	29 5	3 0
29	29 69	29.47	29.567	49.5	2 P	41.0	3 A	45.3	42 6	37.5	0.4
30	29.72	29.61	29.695	43.0	1:30 P	30.0	12 P	36.5	36.2	29 5	2.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity.	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	38.5	.246	86.0	W.N.W.	134	1 0	14	9 A				
2	36.0	.255	84.0	W.N.W.	124	2.5	22	3 P				
3	32.5	.277	82.5	W.	79	1.5	17	10 A				
4	34.0	.218	91.0	N.N.W.	82	0.5	10	12 P	6 A	12 P	.31	T.
5	35.0	.238	88.0	N.	227	1.0	14	7 A				
6	35.5	.206	91.0	E.	134	0 5	10	3 P				
7	32.0	.222	86.5	S.	44	0.0	—	—				
8	35 5	.248	84.0	N.	117	1.5	17	12 M				
9	41.5	.301	86.5	S.	83	1.0	14	12 P				
10	43.0	.300	92 5	W.	100	2.0	20	3 P				
11	27.5	.179	85.0	N.	112	1.5	17	10 A				
12	22.5	.151	83.0	N.W.	52	0.0	—	—				
13	29.5	.197	86.0	N.W.	38	0.0	—	—				
14	26.5	.178	82.5	W.S.W.	129	3.5	26	2 P				
15	35 0	.259	82.0	S.	52	0.5	10	1 P				
16	40 0	.297	85.5	S.E.	52	0.0	—	—				
17	45.0	.366	98.0	N N.W.	24	0.0	—	—	8 A	12 P	.85	
18	55 0	.483	94.0	S.S W.	225	6 0	35	6 A	0 A	12 P	.84	
19	43 0	.317	87 0	S W.	178	2.0	20	0 A	0 A	10 A	.13	
20	42.5	.290	94 0	W.	42	0.0	—	—	1 P	8 P	.08	
21	34 0	.248	81 5	N.N.W.	101	0.5	10	2 P				
22	27 0	.193	79.5	N.W.	110	2.0	20	9 P				
23	20.0	.195	57.5	W N.W.	297	3 0	24	1 P				
24	21 0	.201	58.0	W.S.W.	149	2.5	22	1 A				
25	29.5	.207	82.5	W.N.W.	175	3.0	24	3 P				
26	6 0	.101	62 0	W.S.W.	246	3.0	24	10 P				
27	16.0	.138	71.5	S.	77	0.5	10	7 A				
28	22.5	.198	64.5	S.S.E.	98	0.5	10	3 P	5 A	12 P	.23	
29	35 5	.261	81 0	W.S.W.	181	5.5	33	12 M	0 A	9 A	.43	
30	18.5	.201	52.5	W.S.W.	268	5.5	33	2 P	2:30 P	3 P	T.	T.

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

During the month of November the weather presented but few features of unusual interest. Perhaps the most noticeable feature was the fact that it was not quite so cold as is usual at this time of year and that winter had not fully started when the month closed. The large amount of cloudiness was also a feature which could not well escape notice. Wind directions were unusually variable although the total wind movement was not large.

An analysis of the several records kept at this station shows the following features: The mean barometer was practically normal and the range much greater than usual. The last week of the month was a period of rather low barometer, and rather rapid changes in pressure.

The mean temperature was about one and one-half degrees higher than the normal. The maximum temperature was slightly less than usual and the minimum was higher than its normal value, giving a comparatively small range. The mean dew-point and relative humidity were both high.

The total precipitation was about ten per cent below the normal and nearly all of it fell during the last half of the month. Traces of snow fell early in the month and also on the last day of the month.

The total wind movement was about eighty per cent of the normal and but one gale was recorded. The amount of sunshine was unusually small, especially during the last half of the month.

J. E. OSTRANDER, Meteorologist.

H. BERMAN, Acting Observer.

BULLETIN No. 360. DECEMBER, 1918

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.38, 19th, 9 A
Minimum reduced to freezing,	29.20, 4th, 12 M
Reduced maximum reading	30.70, 19th, 9 A
Reduced minimum reading,	29.51, 4th, 12 M
Mean semi-daily reduced	30.130
Monthly range	1.19

***Air Temperature.** In Degrees Fahr.

Highest	52.0, 21st, 3 P
Lowest	-3.0, 7th, 9 A
Mean hourly	28.7
Mean of means of max. and min.	29.3
Mean sensible (wet bulb)	26.2
Monthly range	55.0
Highest mean daily	46.8, 22d
Lowest mean daily	12.0, 7th
Mean maximum	36.5
Mean minimum	22.0
Mean daily range	14.5
Greatest daily range	28.0, 21st
Least daily range	5.0, 14th, 25th

Humidity.

Mean dew point	22.9
Mean force of vapor	.159
Mean relative humidity	84.5

Precipitation. In inches.

Total precipitation, in inches	2.95
Total snow, in inches	7¼
Number of days on which .01 inch or more rain fell	11
Days of sleighing, 10	

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3239 m
Greatest daily movement	348m, 1st
Least daily movement	4m, 20th
Mean daily movement	104 m
Mean hourly velocity	4.3 m

Maximum pressure per square foot, 11.0 lbs = 49m per hour, 1st, 4 A, N.W.

Maximum velocity for 5 minutes, 24m per hour, 1st, 1 A, W.N.W.

Prevailing direction, West Northwest.

Summary.

Southwest	10 per cent.
South Southwest	10 " "
West Northwest	16 " "
North	13 " "
West	10 " "
Northwest	19 " "
North Northwest	13 " "
Other directions	9 " "

Weather.

Mean cloudiness observed	55 per cent
Total cloudiness recorded by the Sun Thermometer	125 hours = 44 per cent
Number of clear days	11
Number of fair days	9
Number of cloudy days	11

Bright Sunshine.

Number hours recorded, 158 hrs, = 56 per cent

Rain, 1st, 6th, 11th, 13th, 14th, 15th, 22d, 24th, 25th.

Snow, 1st, 3d, 4th, 6th, 7th, 11th, 26th, 27th. 31st.

Hail, 11th.

Gales, 35 miles or more per hour 47 m., 1st, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.27	29.54	30.000	33.0	4 A	17.0	12 P	25.0	25 6	18.3	8.3
2	30.29	29.94	30.140	31.0	8:30 P	13.5	7:30 A	22.3	22.6	20.0	6.5
3	29.94	29.68	29.809	35.0	3 P	27.5	2 A	31.3	30 5	29.0	5.1
4	29.68	29.51	29.558	37.0	4 P	28.0	10 A	32.5	31.2	28.5	5.0
5	29.95	29 63	29.864	32.5	8 A	22.0	8 P	27.3	28.4	25.0	6.3
6	30.22	29.61	29.884	27.5	2 P	12.0	12 P	19.7	20.5	18 0	6.5
7	30.33	29.96	30.192	23.0	8 P	−3.0	9 A	10.0	12.0	11.5	2.0
8	29.96	29.71	29.830	32.5	4 P	20.5	0 A	26.5	25.7	24.3	0.5
9	30.04	29.75	29.806	43.5	1 P	28.0	6 A	35.7	35.1	29.7	8.0
10	30.53	30.04	30.306	31.0	0 A	14.0	12 P	22.5	20 2	12.5	8.0
11	30.58	30 35	30 512	26.5	12 P	9.5	6 A	18.0	17.4	19.3	0.4
12	30.40	30.29	30.355	38.0	3 P	26.5	0 A	32.3	31.6	30 5	6 5
13	30.41	30.25	30.365	34.0	3 P	26 0	6 A	30.0	30.8	30 0	4.3
14	30.25	29.88	30 078	37.0	2 P	32 0	1 A	34.5	34.5	34.0	2.8
15	30.28	29.85	30.092	43.0	2 P	31.0	12 P	37.0	37.6	39.0	3.5
16	30.51	30.28	30 476	36.0	3 P	31.0	0 A	33 5	33.3	32.3	4.5
17	30 58	30.42	30.522	40.0	3 P	27.0	12 P	33.5	31.8	26.3	8.3
18	30.69	30.54	30.659	40.0	3 P	22.0	8 A	31 0	28 3	23 0	7.7
19	30 70	30 59	30.650	41.5	3 P	15 0	7:30 A	28.3	25 2	17.5	8.2
20	30.62	30 48	30.580	45.0	3:30 P	18.0	7:30 A	31.5	29.3	23.7	8.0
21	30.48	30.38	30.432	52.0	3 P	24.0	6 A	38.0	34.5	31.0	7.7
22	30 38	29 99	30 202	50 0	12 P	27.5	3 A	38 7	37.6	40 7	1.3
23	30.20	29 92	30.116	50 0	0 A	37 0	12 P	43.5	46.8	44 7	7.8
24	30.19	29.62	30.037	41.5	5 P	28.0	7 A	34.7	34.4	33 3	2.8
25	29.68	29.53	29.572	40.0	5 P	35.0	9 A	37.5	36.1	35 0	0.4
26	29.95	29.68	29.827	36 0	3 A	26.5	12 P	31.3	31.7	29.0	1.0
27	30.08	29 95	30.048	28.5	2 P	19.5	8:30 A	24.0	24.5	21.7	8.0
28	29 95	29 70	29.820	31.5	2 P	19 0	12 P	25 3	24.0	20.5	6.5
29	30.04	29.69	29 850	33.5	3 P	18.0	2 A	25.7	22.6	19.3	3 0
30	30.30	30.04	30.215	35.0	4:30 P	16.0	2 A	25.5	25.6	23 3	8.5
31	30.33	30.13	30.225	27.0	12 P	15.5	8:30 A	21.3	21.9	20 5	0.1

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	7.0	.120	53.5	N.	348	11.0	47	4 A	3 A	4:30 A	.02	T
2	13.5	.128	67.5	N.W.	61	0.5	10	7 P				
3	24.0	.172	79.0	S.	34	0.0	—	—	0 A	5 A	06	$\frac{1}{2}$*
4	23 0	.170	74.0	W.N.W.	32	1.5	17	12 P	11 P	12 P	T	T
5	21.5	.145	84.0	W.N.W.	259	3.0	24	2 P				
6	15.5	.106	85.0	N.N.W.	181	3 0	24	3 P	0 A	1 P	.40	6
7	8.5	.083	89 5	S.W.	81	0.5	10	3 P	1:30 P	3 P	T	T
8	22.5	.136	91.0	S.S.W.	32	0.0	—	—				
9	24.5	.185	74.5	N.W.	154	2.0	20	2 P				
10	7.0	.084	73.5	N.	298	5.5	33	11 A				
11	17.5	.110	92.0	N N.W.	45	0.0	—	—	1 P	11 P	.48	$\frac{1}{2}$
12	28.5	.175	92.5	W.N.W.	86	0.0	—	—				
13	28.5	.170	95.0	W.	5	0.0	—	—	2 P	12 P	.20	
14	32.5	.198	95.0	W.N.W.	19	0.0	—	—	0 A	12 P	.76	
15	38 0	.243	94.0	N.N.W.	76	1.0	14	1 A	0 A	6 P	.11	
16	30 0	.190	90.5	N.	124	1.0	14	11 P				
17	19.5	.160	68.0	N.N.E.	282	2.0	20	4 A				
18	19.5	.134	81.0	N.	123	0.5	10	1 P				
19	14.5	.103	84.5	W.	18	0.0	—	—				
20	21.0	.140	87.5	S.W.	4	0.0	—	—				
21	29.0	.185	90.0	S.S.W.	41	0.0	—	—				
22	39.0	.272	93 5	S S.W.	28	0.5	10	9 P	1 P	12 P	.25	
23	43.0	.312	89 0	N.W.	160	2.0	20	1 P				
24	32 0	.196	95 5	N.N.E	58	0.0	—	—	9 A	12 P	.51	
25	33 0	.213	89.0	N W.	102	1.0	14	6 P	0 A	2 P	.15	
26	27.0	.166	89.5	W.N.W.	186	1.5	17	7 P	12 M	1 P	T	T
27	19.0	.124	87 0	W.	84	1.0	14	1 A	12 M	6 P	T	T
28	17 5	.118	82.5	N.N W.	69	1.0	14	1 P				
29	16.0	.111	86 0	N.W.	99	1.0	14	3 P				
30	19 5	.136	78.5	S.W.	121	2 0	20	1 P				
31	18.0	.118	86.0	N.W.	29	0.0	—	—	8:30 A	4 P	0.1	T

**Rain or melted snow at base of tower. *Included in following day.

Annual Summary for 1918.

Pressure. In inches.

Maximum reduced to freezing, ... 30.38, Dec. 19th, 9 A.
Minimum reduced to freezing, ... 28..52 Jan. 15th, 1 P.
Maximum reduced to freezing and sea-level, ... 30.70, Feb. 21st, 12 P. Dec. 19th, 9 A.
Minimum reduced to freezing and sea-level, ... 28.84, Jan. 15th, 1 P.
Mean semi-daily reduced to freezing and sea-level, ... 30.023
Annual range, ... 1.86

***Air Temperature.** In degrees Fahr.

Highest, ... 100.0, Aug. 7th, 3 P.
Lowest, ... —22.5, Feb. 2d, 6 A.
Mean hourly, ... 46.5
Mean of means of max. and min., ... 46.9
Mean sensible (wet bulb), ... 41.9
Annual range, ... 122.5
Highest mean daily, ... 81.7, Aug. 7
Lowest mean daily, ... —9.1, Feb. 5
Mean maximum, ... 58.0
Mean minimum, ... 35.8
Mean daily range, ... 22.2
Greatest daily range, ... 44.5, Apr. 15
Least daily range, ... 3.5, Nov. 20

Humidity.

Mean dew point, ... 37.8
Mean force of vapor, ...380
Mean relative humidity, ... 76.4

Wind.

Total movement, ... 50.435 m
Greatest daily movement, ... 606m., March 3
Least daily movement, ... 4 m., Dec. 20
Mean daily movement, ... 138 m
Mean hourly velocity, ... 5.7 m
Maximum pressure per square foot, 20.0 lbs., 63 m. per hour, Feb. 26, 3 P., W.N.W.
Maximum velocity for 5 minutes, 45 m. per hour, Feb. 26th, 1 P., W.N.W.
Prevailing direction, ... West.

Summary.

South Southwest . . . . . 16 per ce
South . . . . . 15 " "
Northwest . . . . . 11 " "
North Northwest, ... 10 " "
North . . . . . 9 " "
Other directions, ... 39 " "

Precipitation. In inches.

Total precipitation, rain or melted snow, . 37.47
Snow total in inches, ... 50¾
Number of days on which .01 or more rain or melted snow fell, ... 123

Weather.

Mean cloudiness observed, ... 47 per cent.
Total cloudiness recorded by Sun Thermometer, ... 1920 hrs.=43 per cent.
Number of clear days, ... 106
Number of fair days, ... 151
Number of cloudy days, ... 108

Bright Sunshine.

Number of hours recorded, 2532 hrs.=57 per cent

Dates of Frosts.

Last, ... April 26th
First, ... Sept. 11th

Dates of Snow.

Last, ... April 13th
First, ... Nov. 4th
Total days of sleighing, ... 79

Gales of 50 or More Miles Per Hour.

Feb. 4th, 57m., W.N.W.: Feb. 20th, 57m, N.W.; Feb. 25th, 53m., S.W.; Feb. 26th, 63m, WN.W.; March 3d, 60m., N.W.

*Temperature in ground shelter.

H. BEAMAN,
Acting Observer.

J. E. OSTRANDER,
Meteorologist.

BULLETIN No. 361. JANUARY, 1919

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT

STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.34, 12th, 9 A
Minimum reduced to freezing,	29.02, 24th, 5 A
Reduced maximum reading	30.68, 12th, 9 A
Reduced minimum reading,	29.33, 24th, 5 A
Mean semi-daily reduced	30.008
Monthly range	1.35

***Air Temperature.** In Degrees Fahr.

Highest	54.0, 2d, 3 A
Lowest	-8.5, 12th, 7:30A
Mean hourly	28.1
Mean of means of max. and min.	28.7
Mean sensible (wet bulb)	25.1
Monthly range	62.5
Highest mean daily	39.5, 2d
Lowest mean daily	3.5, 12th
Mean maximum	37.7
Mean minimum	19.8
Mean daily range	18.0
Greatest daily range	34.5, 13th
Least daily range	4.5, 3d

Humidity.

Mean dew point	21.1
Mean force of vapor	.156
Mean relative humidity	79.6

Precipitation. In inches.

Total precipitation, in inches	2.02
Total snow, in inches	6¾
Number of days on which .01 inch or more rain fell	8

Days of sleighing, 20

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	4554 m
Greatest daily movement	355m, 11th
Least daily movement	10m, 1st
Mean daily movement	144 m
Mean hourly velocity	6.0 m

Maximum pressure per square foot, 12.0 lbs = 50m per hour, 11th, 7 A, N.W.

Maximum velocity for 5 minutes, 36m per hour, 11th, 7 A, N.W.

Prevailing direction, West.

Summary.

Southwest	13 per cent.
South Southwest	10 " "
West Northwest	23 " "
West	10 " "
Northwest	10 " "
West Southwest	10 " "
Other directions	24 " "

Weather.

Mean cloudiness observed	52 per cent
Total cloudiness recorded by the Sun Thermometer	128 hours = 44 per cent
Number of clear days	9
Number of fair days	13
Number of cloudy days	9

Bright Sunshine.

Number hours recorded, 166 hrs, = 56 per cent

Rain, 1st, 2d, 23d, 24th.

Snow, 2d, 3d, 4th, 7th, 8th, 9th, 17th, 29th. 31st.

Gales, 35 miles or more per hour 135m., 10th, N.W.; 50m, 11th, N.W.; 37m, 24th, W.N.W.; 36m, 31st, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.11	29.72	29.863	53.0	12 P	27.0	0 A	40.0	34.3	35.0	0.0
2	30.07	29.67	30.020	54.0	3 A	32.5	12 P	43.3	39.5	33.0	6.4
3	30.04	29.83	29.908	32.5	0 A	28.0	12 P	30.3	30.3	28.5	3.1
4	30.27	29 87	30.043	28.5	0 A	11.0	12 P	19.7	21.8	18.7	6.7
5	30.50	30.27	30.483	29.0	3:30 P	2.0	7:30 A	15.5	14.9	8.0	8.1
6	30.49	30.35	30.445	27.0	4 P	5.0	12 P	16.0	14.5	9.3	6.5
7	30.49	30.26	30 403	32.0	8:30 P	5.0	0 A	18.5	15.7	20.5	6.0
8	30.26	29.90	30.048	36.5	4:30 P	26.0	12 P	31.3	30.5	30.5	1.5
9	29 90	29.50	29 655	33.5	4 P	20.0	12 P	26.7	28.0	27.0	0.9
10	30.12	29.72	29.982	24.0	12 P	−0.5	7:30 A	11.7	13 3	10.7	7.5
11	30.52	29 79	30.224	33.5	6:30 A	1.5	12 P	17.5	17 6	15.3	7.0
12	30.68	30.52	30.660	18.5	4 P	−8.5	7:30 A	5.0	3.5	0.0	8.8
13	30.59	30.14	30.361	30.0	4:30 P	−4.5	7:30 A	12.7	12.5	11.5	8.0
14	30.14	29.84	29 935	40.0	3:30 P	26.0	0 A	33.0	33.1	32.5	5.6
15	30.03	29.80	29.933	39.0	3 P	25.5	12 P	32.3	33.6	30.0	6.2
16	30.05	29.94	30.038	45.0	4 P	22.5	3 A	33.7	33.7	28 0	8.6
17	30 03	29.83	29.948	45.0	3:30 P	23 0	7:30 A	34.0	34.1	28.7	4.6
18	29.90	29.63	29.746	39.5	4:30 P	26.0	8 A	32.7	30.4	26.3	5.8
19	30.07	29 67	29.882	43.0	3 P	24.0	2 A	33 5	34.4	32.3	6.3
20	30.21	30.04	30.128	45.0	4 P	18.5	7:30 A	31.7	31.1	24 5	8.0
21	30.28	30.03	30.239	40.5	3 P	20.0	7:30 A	30.3	30.7	26.3	6.9
22	30.30	30 21	30 254	38.5	9:30 P	32.0	0 A	35.3	34.3	33.5	0.0
23	30.21	29 54	29.938	39 5	5 A	34.0	9:30 P	36.7	36.3	34.7	0.0
24	29.72	29.33	29 511	39.5	9 A	23.5	12 P	31.5	31.6	28 3	0.8
25	29.92	29.72	29 882	40.5	3:30 P	22.0	7 A	31.3	29 6	25.7	9.1
26	29.86	29.66	29.854	45.0	4 P	25.0	7:30 A	35.0	33.1	28.5	7.5
27	29.95	29 75	29.878	38.5	11 A	30 0	6:30 A	34.3	36.0	34.3	4.0
28	29.98	29 73	29.879	47.0	3 P	29 5	7:30 A	38.7	36.3	30 0	8.2
29	29.75	29.58	29.670	38.5	4 P	30.0	8 A	34.3	32 5	28.0	3.3
30	29.85	29.69	29.774	37.0	4 P	29.0	5 A	33.0	33.7	30.3	8.0
31	29.82	29.69	29 751	36.0	2 A	21.5	12 P	28.7	30.6	26.7	8.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	34.0	.209	97.5	W.	10	2.0	20	12 P	1 A	12 P	.46	
2	29 5	.213	77.5	N.W.	224	2.5	22	4 A	0 A	12 P	.19	½
3	25.5	.164	87.0	N.	158	1.5	17	10 A	0 A	11 A	.30	5
4	12.5	.115	73.0	N.W.	178	3.0	24	1 P	6 A	10:30 A	.05	¼
5	3.0	.070	74.0	S.W.	54	0 5	10	11 P				
6	6.5	.072	84.0	N.	153	2.0	20	6 P				
7	18.5	.125	91.0	W.	53	1.0	14	8 P	8 A	11 A	T	
8	28.0	.180	85.5	S.S.W.	180	1.5	17	7 A	6 A	11 A	.04	¼
9	23.5	.158	84.0	S.W.	136	5.5	33	11 P	1 P	3 P		T
10	6.0	.084	76.5	S.W.	314	6.0	35	3 A				
11	9.5	.108	72.0	N.N.W.	355	12.5	50	7 A				
12	-3.0	.047	85.0	W.S.W.	61	0.5	10	0 A				
13	15.0	.094	86.5	W.S.W.	37	1.5	17	8 P				
14	30.0	.195	85.5	S.	100	0.5	10	3 A				
15	26.0	.183	77.0	W.N.W.	252	4.5	30	5 P				
16	22.0	.175	70.0	W.S.W.	215	3.0	24	2 P				
17	24.0	.184	74.0	S.S.E.	109	2.5	22	6 A	11:30 A	12 M		T
18	22.0	.155	78.0	N.W.	21	0.0	—	—				
19	25.5	.267	71.0	W.N.W.	152	3.0	24	11 A				
20	19.5	.149	76.0	S S.W.	104	1.0	14	6 P				
21	23.5	.152	86 5	S.S.E	61	0.0	—	—				
22	30.5	.204	86 0	S.	65	0.5	10	5 P				
23	33.5	.206	95.5	S.S.W.	44	0.0	—	—	8 A	12 P	.83	
24	23.5	.181	73.5	N.N.W.	273	7.0	37	12 M	0 A	2 A	.13	
25	22.5	.150	83.0	W.N.W.	193	2.5	22	2 A				
26	24 0	.175	74.5	W.	46	2.5	22	6 P				
27	30.0	.216	77.5	W.N.W.	339	5.0	32	10 A				
28	22 5	.193	66.5	S.W.	117	1.0	14	2 A				
29	22 0	.172	71 5	W.N.W.	45	1.0	14	11 P	8 A	8:30 A	T	T
30	24.0	.193	69.0	W.N.W.	192	2.0	14	1 P				
31	21.5	.160	75.0	W.N.W.	313	6.5	36	6 P	10 A	10 P	.02	¼

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month presented a marked contrast to that of a year ago, when such abnormally low temperature prevailed. While the month was not as cold as usual it was not marked by any especially warm periods. Zero weather was noted on two dates near the middle of the month.

The precipitation was much less than the normal. A rain storm followed by about six inches of snow occurred the first part of the month. The snow remained until a rather heavy rain storm on the 23d, which was practically the last storm of the month.

The record of the several weather elements compared with the normals shows the following features of interest: The mean barometer was rather low and the range of pressure less than usual. The pressure during the last half of the month was considerably lower than during the first half. The record for the month was during the high barometer on the 12th. The maximum pressure was slightly less than the normal and the minimum pressure was comparatively high.

The mean temperature was more than three degrees above the normal, and the range a little greater than usual. The minimum temperature was slightly lower than the average value for this feature.

The mean dew point and relative humidity were both higher than usual.

The total precipitation was about sixty per cent of the normal, and comparatively little of it occurred as snow.

The total wind movement was below the average, and but few gales were noted. Much of the wind was from a westerly direction.

The amount of sunshine was considerably greater than usual.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 362. FEBRUARY, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.11, 20th, 9 A
Minimum reduced to freezing, 28.96, 15th, 2 P
Reduced maximum reading . . 30.43, 20th, 9 A
Reduced minimum reading, . 29.27, 15th, 2 P
Mean semi-daily reduced 29.963
Monthly range 1.16

***Air Temperature.** In Degrees Fahr.

Highest . . . . . 49.0, 13th, 3 P
Lowest 8.5, 11th, 7:30A
Mean hourly 28.4
Mean of means of max. and min. 28.7
Mean sensible (wet bulb) 24.2
Monthly range 40.5
Highest mean daily 36.5, 24th
Lowest mean daily . . . . . 19.7, 11 h
Mean maximum 37.4
Mean minimum 20.0
Mean daily range 17.4
Greatest daily range 36.0, 13th
Least daily range 4.0, 14th

Humidity.

Mean dew point 20 2
Mean force of vapor 149
Mean relative humidity 78.6

Precipitation. In inches.

Total precipitation, in inches 2.80
Total snow, in inches 11½
Number of days on which .01 inch or more rain fell 8
Days of sleighing, 3

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

Wind.

Total movement . . . . . 5031 m
Greatest daily movement 430m, 19th
Least daily movement 26m, 13th
Mean daily movement 180m
Mean hourly velocity . . . . . 7.5 m
Maximum pressure per square foot, 8.5 lbs 41m per hour, 24th, 10A, W.N.W.
Maximum velocity for 5 minutes, 30m per hour, 24th, 10A, W.N.W.
Prevailing direction, Northwest.

Summary.

Northwest . . . . . 29 per cent
North Northwest . . . . . 21 " "
North . . . . . 14 " "
West Northwest . . . . . 11 " "
Other directions . . . . . 25 " "

Weather.

Mean cloudiness observed . . . . 38 per cent
Total cloudiness recorded by the Sun Thermometer . . 80 hours = 27 per cent
Number of clear days 17
Number of fair days 7
Number of cloudy days 4

Bright Sunshine.

Number hours recorded, 216 hrs. = 73 per cent
Rain, 4th, 14th, 25th, 26th, 28th.
Snow, 4th, 14th, 21st, 22d, 23d, 25th.26th.
Hail, 14th.
Gales, 35 miles or more per hour: 39m., 1st, N.N.W.: 35m, 2d, N.W.: 35m, 18th, N.N.W.: 40m, 19th, N.W.: 41m, 24th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean, Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.86	29.77	29.838	31.0	4 P	17.0	7:30 A	24.0	23.5	19.7	9.5
2	30.10	29.84	29.994	40.0	3:30 P	21.5	0 A	30.8	28.4	23.7	9.0
3	30.17	30 07	30 120	47.0	4:30 P	19.5	6 A	33.3	29.8	23.7	8.5
4	30.07	29.72	29 888	36.5	6:30 P	18.5	7:30 A	27.5	27.9	26 7	6.3
5	29.81	29.68	29.770	37.0	12 M	23.5	12 P	29.7	31.1	26.5	9.2
6	29.91	29.81	29 895	33.5	2:30 P	17.0	7:30 A	25.3	26.3	23.3	8.5
7	30.10	29.91	30.062	37.0	3:30 P	22.5	6 A	29.7	28.8	24.3	9.3
8	30.12	29 97	30.052	36.0	3:30 P	17.5	5:30 A	26.7	27.0	24 5	7.0
9	30.01	29.93	30.005	36.5	3:30 P	19.0	12 P	27.7	26.5	20 3	9.4
10	30.04	29.92	30 036	31.0	4:30 P	15.0	7 A	23.0	21.5	17.7	9.5
11	30.12	29 97	30 086	33.5	4 P	8.5	7:30 A	21.0	19 7	14.5	9.9
12	30 05	29.91	30.000	40.0	4 P	9.0	7 A	24.5	21.9	16.7	9.0
13	30.02	29.88	29.969	49.0	3 P	13.0	7:30 A	31.0	30 9	23.0	9.1
14	29 90	29.37	29 558	35.0	3 P	31.0	7 A	33.0	33.2	32.0	0.0
15	29.38	29 27	29.325	39.0	4 P	32.0	8 A	35 5	34.9	32.7	3.0
16	29.74	29.38	29.629	37 5	0 A	23.5	5 P	30.5	30.9	25.3	7.7
17	29.88	29.74	29.825	35 5	2:30 P	20 0	7:30 A	27.7	27.0	23 5	10.0
18	30.02	29 79	29.900	36.0	3 P	20.0	7:30 A	28.0	26.8	23.7	8.5
19	30.33	30 02	30 250	35.0	3:30 P	18.0	7:30 A	26.5	23.9	20.0	10.2
20	30.43	30.28	30.370	41.5	3:30 P	13.5	7:30 A	27.5	27.9	24 0	10.3
21	30.32	30.10	30 244	30.0	12 M	21.0	6:30 A	25.5	26 2	23.7	3.5
22	30.20	30 00	30.109	38.5	2:30 P	27.0	0 A	32.7	32.7	31.7	6.9
23	30 00	29.67	29.741	40.0	9 P	32.0	7 A	36.0	35.3	33.5	6.8
24	30.15	29.77	30.034	42.5	3:30 P	27 5	12 P	35 0	36.5	31.3	9.1
25	30.17	29.67	30.004	39 0	5 P	18.0	7 A	28.5	30.2	27.3	7.6
26	30 20	29 57	29.829	35.5	0 A	19.5	12 P	27 5	28.7	24.5	8.2
27	30.25	30.20	30.233	32.0	4:30 P	14.0	7 A	23 0	22 8	19 3	9.1
28	30.27	29 96	30.188	43 0	12 P	20.5	6 A	31.7	33.6	20.0	1.4

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	14.0	.119	74.5	N.W.	332	7.5	39	4 P				
2	18.5	.142	71.0	N.N.W.	324	6 0	35	1 A				
3	17.0	.145	69.0	N.N.W.	125	1.5	17	7 A				
4	24.5	.156	88.0	N.N.W.	42	1.0	14	7 P	2:30 P	9 P	.02	T
5	21.5	.162	72.5	N.W.	252	4.0	28	1 P				
6	20.5	.135	84.5	W.N.W.	105	4.0	28	11 A				
7	21.5	.138	85.0	W.N.W	148	2 0	20	12 M				
8	21.5	.143	85.0	S W.	55	0.0	—	—				
9	16.5	.118	79.5	N.N.W.	105	2.5	22	11 A				
10	14.5	.106	81.5	N.	291	4.0	28	12 M				
11	10.0	.093	80.0	N.	131	2.5	22	12 M				
12	10.0	.107	66.5	W.N.W.	43	0.5	10	4 P				
13	15.5	.148	66 0	E.S.E.	26	0.5	10	9 P				
14	30.0	.188	90.0	E.N E.	77	0 0	—	—	2 A	6 P	.56	½
15	29.5	.196	86.0	N.	52	0.0	—	—				
16	19.0	.154	67.0	N.W.	334	4.5	30	1 P				
17	19.0	.137	76 0	N.W.	319	4.5	30	1 P				
18	19.5	.139	79.5	N.N.W.	167	6.0	35	10 P				
19	14.5	.118	73.0	N.W.	430	8.0	40	4 P				
20	19.5	.142	79 0	N.	194	3 5	26	2 P				
21	19.5	.138	81.0	N.N.W.	65	0.5	10	10 A	1 P	12 P	.20	3
22	30.0	.184	93.0	S.E.	76	1.0	14	7 P	0 A	4 A	.12	1½
23	29.0	.213	79.0	N.W.	137	4 0	28	7 P	4 A	12 M	96	6
24	23.5	.205	61.5	N.W.	406	8.5	41	10 A				
25	22.0	.170	75.5	S.S.W.	61	1.0	14	6 P	7:30 P	12 P	.46	¼
26	20 5	.148	76 5	N.W.	320	5 5	33	4 P	0 A	4 A	.42	¼
27	14.5	.116	75.0	W	173	2.0	20	2 P				
28	31.0	.219	86.0	S.S.W.	121	1.0	14	12 M	5 P	12 P	.06	

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

During the month of February the weather was generally pleasant with an unsually large number of bright sunshining days. Only four days were classed as cloudy, and more than one half the days were clear. No zero weather was noted and the temperature was considerably above the normal. The ground was practically free from snow until the last week of the month. The precepitation was very small until the last week, when a considerable amount occurred.

The records of the several weather elements show the following features of interest: The mean borometer was low for mid-winter, and the range considerably less than the normal. The maximum pressure was considerably lower than the normal for this feature. The total wind movement was slightly more that the normal, and the direction was from the northwest quadrant most of the time.

The mean temperature was above four degrees higher than the normal, and the range only about two-thirds of the normal amount. This was largely due to the fact that the minimum temperature was nearly seventeen degrees higher than the average value for this feature. The period between the maximum and minimum temperatures of the month was less than two and one-half days.

The mean dew point was about three degrees above the normal, and the relative humidity was nearly normal.

The total precipitation was about one-half an inch less than the normal, and the greater part occurred as rain. A heavy snow fall occurred during the last week of the month, but it melted rapidly, so that there was but little sleighing.

The number of hours of sunshine recorded was greater than any previous record for February at this station.

The month closed with a drizzling rain in progress, and a rather high temperature.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 363. MARCH, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.61, 15th, 8 A
Minimum reduced to freezing,	28.89, 28th, 12 M
Reduced maximum reading	30.92, 15th, 8 A
Reduced minimum reading,	29.20, 28th, 12 M
Mean semi-daily reduced	30.115
Monthly range	1.72

***Air Temperature.** In Degrees Fahr.

Highest	68.0, 21st, 3 P
Lowest	12.0, 14th, 7A
Mean hourly	37.8
Mean of means of max. and min.	38.5
Mean sensible (wet bulb)	33.-
Monthly range	56.0
Highest mean daily	55.6, 21st
Lowest mean daily	23.5, 29th
Mean maximum	48.1
Mean minimum	28.8
Mean daily range	19.3
Greatest daily range	38.5, 26th
Least daily range	4.5, 16th

Humidity.

Mean dew point	26.8
Mean force of vapor	.226
Mean relative humidity	70.6

Precipitation. In inches.

Total precipitation, in inches	4.22
Total snow, in inches	2.0
Number of days on which .01 inch or more rain fell	11

Days of sleighing, None

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	7361 m
Greatest daily movement	580m, 29th
Least daily movement	27m, 17th
Mean daily movement	237m
Mean hourly velocity	9.9 m

Maximum pressure per square foot, 14.0 lbs 53m per hour, 28th, 10P, N.W.

Maximum velocity for 5 minutes, 30m per hour, 28th, 7P. N.W.

Prevailing direction, Northwest.

Summary.

Northwest	10 per cent
North Northwest	13 " "
North	19 " "
West Northwest	13 " "
South Southwest	10 " "
Other directions	35 " "

Weather.

Mean cloudiness observed	51 per cent
Total cloudiness recorded by the Sun Thermometer	139 hours = 37 per cent.
Number of clear days	12
Number of fair days	12
Number of cloudy days	7

Bright Sunshine.

Number hours recorded, 232 hrs.,= 63 per cent.

Rain. 1st, 5th, 9th, 16th, 17th, 18th, 19th, 27th, 28th, 29th, 31st.

Snow. 16th, 28th, 20th, 30th, 31st.

Hail. 28th.

Gales. 35 miles or more per hour: 39m., 1st, S.W.: 45m, 10th, W.N.W.: 36m, 22d, N.: 53m, 28th, N.W.: 47m, 29th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean, Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.14	29.78	29.975	50.5	12 M	30.5	12 P	40.5	43.0	38.5	6.2
2	30.22	30.07	30.172	46.5	5 P	23 5	7:30 A	35.0	32.5	27.7	10.6
3	30.18	30.05	30.155	53.5	4 P	26.0	7:30 A	39.7	36.5	32.0	9.9
4	30.18	29.85	30.044	57.0	3 P	27.5	7:30 A	42.3	39.8	34.0	10.1
5	29.85	29.55	29.659	54.5	3:30 P	38.0	7 A	46.3	46 2	42.5	7.8
6	30.26	29.66	30.125	42.5	4 P	25.0	7:30 A	33.7	33 6	26.7	10.9
7	30.36	30.23	30.319	41.0	3 P	22.0	5 A	31.5	30.9	26.0	6.5
8	30 58	30.36	30 522	51.0	4 P	26.0	7:30 A	38.5	36.3	32.7	9.8
9	30.46	29.46	29.767	43.0	12 P	31.5	3 A	37.3	36.2	35 5	0.0
10	30.04	29 47	29 887	43.0	4 P	33.5	12 P	38.3	38.8	32.7	8.7
11	30.17	29.96	30.075	45.0	3 P	31.0	6 A	38.0	35 8	30.7	5.5
12	30.31	30.07	30.210	51.0	4:30 P	27.0	6:30 A	39.0	39.5	32.7	11.0
13	30.59	30.03	30.334	48.0	9 A	22.0	12 P	35.0	36.1	30 5	8.3
14	30.79	30 59	30.761	37.0	4:30 P	12.0	7 A	24.5	23.8	18 0	10.3
15	30.92	30.79	30 862	45.0	4 P	15.0	6:30 A	30.0	30.9	27 7	10.3
16	30.83	30.61	30 732	33.0	0 A	28 5	7 A	30.7	31.3	30.5	0.3
17	30.61	30.14	30.322	37.0	3:30 P	32.0	0 A	34.5	33.7	31.7	3.3
18	30.14	29.92	29.974	46.5	3 P	32.0	2 A	39.3	38.5	36.0	0.2
19	30.40	30.11	30.252	40.5	8:30 P	35.0	10:30 A	37.7	37 6	37.0	0.0
20	30 40	30.30	30 348	62 5	3 P	38.0	5 A	50.3	50.2	41.7	9.7
21	30.30	30 12	30 166	68.0	3 P	46.0	12 P	57.0	55 6	47 5	11.0
22	30.20	30.16	30.189	51.0	3 P	35.0	12 P	43.0	41.5	33.7	9.2
23	30.21	29.99	30.030	46.0	2 P	33.0	3 A	39 5	39.8	37.0	8.5
24	30 21	30.00	30.118	54.0	3 P	35.5	12 P	44.7	44.6	33.3	11.9
25	30.27	30.14	30 222	61.0	5 P	26 0	6:30 A	43 5	42.8	33.5	11.7
26	30.22	29 95	30.075	66.5	3:30 P	28.0	6:30 A	47.3	46 4	40.0	9.3
27	30 02	29.52	29.742	62.5	2:30 P	42 0	7:30 A	52.3	51.5	45.7	4.6
28	29.52	29.20	29.401	53.0	2 A	20.0	7:30 P	36.5	31.7	26 5	0 0
29	29.80	29.49	29 688	26.0	12 P	19 5	7:30 A	22.7	23 5	23 0	8.6
30	29.77	29.67	29.738	37.0	2 P	26 0	0 A	31.5	31.7	31.5	8.3
31	29.74	29 67	29.708	38.0	3 P	27 0	12 P	32.5	32.0	27.5	9.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	37.0	.265	86.0	W.N.W.	286	7.5	39	7 A	0 A	9 A	.6	
2	22.0	.169	71.5	W.N.W.	78	0 0	—	—				
3	28.5	.199	81.5	W.	55	0.5	10	10 A				
4	28.0	.232	68.0	S.W.	167	3.5	26	5 P				
5	40.5	.301	83.0	S.S.W.	215	2.0	20	5 P	9 P	12 P	.02	
6	19.0	.167	63.5	N.N.W.	238	3.0	24	7 A				
7	20.5	.162	71.0	E.S.E.	113	0.0	—	—				
8	29.0	.203	79.5	W.S.W.	101	0.5	10	9 P				
9	34.0	.214	91.0	N.E.	139	1.5	17	12 P	2 A	6 P	.43	
10	25.0	.222	60.5	W.N.W.	438	10.0	45	10 A				
11	23.5	.202	63.5	N.W.	135	3.0	24	4 P				
12	20.5	.238	49.5	W.S.W.	202	3.0	24	11 A				
13	21.0	.225	57.0	N.N.W.	355	3.5	26	6 A				
14	10.5	.116	65 0	N.	277	3 0	24	9 A				
15	18.0	.184	56.0	S.W.	132	0.5	10	3 P				
16	28.0	.177	90.0	SS.E.	105	0.0	—	—	1 A	12 P	.26	*
17	28.5	.190	83.0	S.S.E.	27	0 0	—	—	0 A	12 P	52	
18	32.5	.230	82.0	N.E.	81	3.0	24	7 P	0 A	5 P	.13	
19	35.0	.232	89.5	N.	323	4.5	30	7 A	8 A	9 P	.21	
20	32.5	.347	59.0	N.N.E	247	2.5	22	2 P				
21	38.5	.439	53.5	N.	247	2.5	22	7 P				
22	27.5	.224	67.5	N.	514	6.5	36	7 P				
23	30 0	.256	65.0	N.	451	4.0	28	9 A				
24	17.0	.256	38 5	N.	426	4.5	30	7 A				
25	15.5	.271	36.5	N.W.	112	1.0	14	4 P				
26	31.5	.304	62.5	W.S.W.	80	1.5	17	6 P				
27	41.5	.351	78.0	S.	183	4.5	30	1 P	6 P	12 P	.15	
28	25 5	.148	97.5	W.N.W.	419	14.0	53	10 P	0 A	12 P	1.80	¾
29	20.5	.129	87.5	N.N.W.	580	11.0	47	5 A	0 A	6 A	.05	¼
30	29.0	.186	85.0	N.W.	416	3 0	24	8 A	11 A			T
31	21.5	.169	68.5	N.N.W.	319	3.0	24	5 A	0 A	4 A	.02	¼

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was seasonal in most respects, and the transition from winter to spring was fairly complete. Early in the month the snow had disappeared and the frost soon after left the ground, so that at the equinoctial date plowing could have been done on the light soils. Later in the month heavy rains and colder weather made the conditions for spring work on the soil less favorable. The last part of the month was colder than the beginning of the month. The last few days of the month were marked by heavy winds and stormy conditions.

The records of the several weather elements show the following features of interest: The mean barometer was abnormally high, even for March, and the range of pressure was very large. Owing to the large fluctuations in pressure, the total wind movement was much greater than the normal, and much of the high wind was from the northwest quadrant. The maximum barometric pressure was very high, for this station.

The mean temperature was more than three degrees higher than usual, and the maximum was nearly six degrees above the normal for this feature. The coldest day was near the end of the month.

The mean dew point was nearly normal, and the relative humidity about four points lower than usual.

The total precipitation was slightly more than the normal, and nearly one-half the amount fell during the heavy storm on the 27th to 29th. During the first half the month the precipitation was rather light.

The amount of bright sunshine was considerably more than the normal.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 364. APRIL, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.07, 22d, 9 A
Minimum reduced to freezing,	29.33, 26th, 3 A
Reduced maximum reading	30.37,,22d 9 A
Reduced minimum reading,	29.65, 26th, 3 A
Mean semi-daily reduced	30.029
Monthly range	0.72

***Air Temperature.** In Degrees Fahr.

Highest	74.0, 23d, 4-30 P
Lowest	18.0, 2d, 3 A
Mean hourly	45.4
Mean of means of max. and min.	45.7
Mean sensible (wet bulb)	40.2
Monthly range	56.0
Highest mean daily	56.0, 23d
Lowest mean daily	25.5, 1st
Mean maximum	55.9
Mean minimum	35.4
Mean daily range	20.5
Greatest daily range	38.5, 23d
Least daily range	6.5, 10th

Humidity.

Mean dew point	34.0
Mean force of vapor	.307
Mean relative humidity	68.1

Precipitation. In inches.

Total precipitation, in inches	2.37
Total snow, in inches	Trace
Number of days on which .01 inch or more rain fell	10

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	5374 m
Greatest daily movement	468m, 25th
Least daily movement	50m, 5th
Mean daily movement	179m
Mean hourly velocity	7.5 m

Maximum pressure per square foot, 9.5 lbs 44m per hour, 25th, 3P, W.N.W.

Maximum velocity for 5 minutes, 32m per hour, 11th, 3P, S.S.W.

Prevailing direction, West Northwest.

Summary.

Northwest	20 per cent
West	13 " "
South	10 " "
North Northwest	10 " "
North	13 " "
West Northwest	10 " "
South Southwest	10 " "
Other directions	14 " "

Weather.

Mean cloudiness observed	50 per cent
Total cloudiness recorded by the Sun Thermometer	153 hours = 38 per cent.
Number of clear days	13
Number of fair days	11
Number of cloudy days	6

Bright Sunshine.

Number hours recorded, 249 hrs.,= 62 per cent.

Rain, 5th, 7th, 8th,9th, 10th, 11th, 12th, 16th, 24th, 28th, 29th.

Snow, 25th.

Frost, 1st. 2d, 3d, 15th, 19th, 22d, 24th, 25th, 26th, 27th.

Gales, 35 miles or more per hour: 43m., 11th, S.S.W.; 44m, 25th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.82	29.70	29.778	34.0	2 P	20.0	12 P	27.0	25.5	21.5	10.6
2	30.00	29.81	29.905	40.0	3:30 P	18 0	3 A	29.0	29.9	24.0	10.3
3	30.09	30.00	30.071	52.0	4 P	25.0	6 A	38.5	40.2	35·3	11.2
4	30.07	30.02	30.066	55.0	2:30 P	38.0	6:30 A	46.5	45.5	42.3	4·5
5	30.05	29.92	29.995	49.5	3 P	42.0	7 A	45.7	45.0	42.3	2.1
6	30.00	29.89	29.968	64.0	4 P	41.0	5 A	52.5	50.0	45·5	9.7
7	30.01	29.82	29.987	64.0	4:30 P	45.0	7 A	54.5	52.5	49·3	5.8
8	30.20	30.01	30.153	68.0	4 P	39 0	6:30 A	53.5	52.0	41.5	11.1
9	30.36	30.12	30.302	54.5	4 P	42 0	7 A	48.3	46.6	40.0	8.2
10	30.36	30.04	30.265	43.5	9 P	37.0	5:30 A	40.3	40 8	37.0	0.7
11	30.04	29.71	29.857	64.0	3 P	42.0	0 A	53.0	54.8	55 3	2.1
12	30.18	29 74	30.036	58.0	1 P	46.0	12 P	52.0	51.6	46.5	6.0
13	30.18	29.90	29.960	56.5	0:30 P	42.0	12 P	49 3	48.5	43.5	5·3
14	30.08	29.96	30.022	55.0	4:30 P	38.0	5 A	46.5	45.5	37·7	12.5
15	30.17	30.04	30.121	59 0	4 P	28 5	6:30 A	43.7	44.0	37.7	11.1
16	30.29	29.91	30.206	45.0	2 A	36.5	10 A	40.7	38.3	36.0	0.0
17	29.91	29.75	29.842	59 5	3:30 P	36.0	5 A	47.7	45.8	42.5	8.4
18	30.09	29.85	30.005	55.5	2 P	40.5	6 A	48.0	47.8	42.5	9.0
19	30.26	30 09	30.235	61.0	4 P	36 5	6 A	48.7	47.8	40.5	12.9
20	30 25	30 02	30.121	65.0	0:30 P	31.0	6:30 A	48.0	50.3	44.5	12.0
21	30.28	30.02	30.179	61.0	4 P	42.0	12 P	51.5	51.0	44.3	12.3
22	30.37	30 19	30.282	69 5	6 P	33.0	6 A	51.3	51.0	42.3	13.0
23	30.23	30.06	30.147	74.0	4:30 P	35.5	6 A	54.7	56.0	50.0	12.8
24	30.05	29.78	29.850	51.0	0 A	33.0	12 P	42.0	43 6	40.3	0.0
25	29 79	29.67	29.748	33.5	4:30 P	25.0	7:30 A	29.3	29.7	22.3	10.3
26	29.87	29.65	29.694	38.5	5 P	24.5	3 A	31.5	32.4	29.3	7.0
27	30.10	29.87	30.034	65.5	5 P	29.0	6 A	47.3	48.1	45.0	13.1
28	30.15	29.90	30 070	64.0	1 P	34.5	6 A	49.3	48.4	42.5	8.0
29	29.95	29.86	29 939	53.0	4 P	43.0	5:30 A	48 0	47.3	41.7	6.5
30	30 06	29.94	30.020	66.5	5-30 P	39.0	6 A	52.7	51.1	43.5	12.4

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	17 0	.126	78.5	N.W.	299	3.0	24	11 P				
2	17.0	.149	63.5	N.W.	281	3.5	26	2 A				
3	28.5	.243	66.0	W.	139	3.0	24	4 P				
4	38.5	.293	82.0	S.S.W.	53	0.0	—	—				
5	40.0	.284	88.5	N.E.	50	0.0	—	—	4 A	6 P	.10	
6	42.5	.342	81.5	W S.W.	143	1.0	14	12 P				
7	48.0	.378	88 5	S.	98	1.0	14	11 P	3 A	8 A	.07	
8	30 5	.358	50.5	N.N.E	173	1.5	17	9 A	11 P	12 P	05	
9	34.0	.291	69.5	S.	124	0.0	—	—	0 A	5 A	.10	
10	32.0	.255	72.0	S.	173	2.0	20	1 P	10 A	12 P	.14	
11	54 0	.456	94.0	S.S.W.	362	9.0	43	5 P	0 A	12 P	.36	
12	43.5	.353	80.0	N.W.	140	1.0	14	12 M	0 A	8 A	.06	
13	37.0	.345	64.5	N.W.	116	2.0	20	7 P				
14	27.5	.290	52 5	N.N.W.	205	2.0	20	4 P				
15	31.0	.270	65 5	N.N.W.	61	1.5	17	7 P				
16	33.5	.223	86.5	E.	151	1.0	14	11 A	2 A	12 P	1.29	
17	39.0	.311	79.0	N.	135	0.5	10	4 A				
18	35.5	.338	63 0	W.N.W.	138	2.0	20	6 P				
19	31.5	.330	56.0	N.N.W.	201	2.0	20	11 A				
20	37.0	.367	62.5	SS.W.	209	5.5	33	2 P				
21	36.0	.372	58.0	N.	302	3.5	26	7 A				
22	30.5	.375	49 0	N.	175	0.5	10	11 A				
23	42.0	.478	58.0	W.N.W.	91	2.0	20	10 P				
24	34.5	.284	73.5	W.	125	3.0	24	11 P	9:30A	8 P	.15	
25	9.5	.146	48.0	W.N.W.	468	9.5	44	3 P	12 M	12 P		T
26	20.5	.184	62.5	W.	307	4.0	28	10 A				
27	38.5	.370	66.0	N.W.	71	1.0	14	12 M				
28	36.0	.323	68.0	W.	166	5.0	32	4 P	3 P	6 P	.05	
29	34.5	.325	62.0	N.W.	228	2.5	22	5 P	4 P	5 P	T	
30	35 5	.358	58.0	N.	190	2.0	20	9 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The seasonal progress, which was considerably ahead of the normal when the month began, has not been maintained during the month, and at its close conditions were nearly normal. The cold period near the end of the month checked early growth and did some damage to fruit buds in this vicinity. The high wind and low humidity which accompanied the low temperature materially benefited conditions.

The precipitation during the last part of the month was very light.

The records of the various weather elements compared with their normals show the following features of interest: The mean barometer was slightly above the normal and the range about two-thirds the usual amount. Notwithstanding the small range of pressure the total wind movement was practically normal. The interval between the high and low barometers of the month was less than four days. During the last half of the month the wind was from the northwest quadrant most of the time.

The mean temperature was slightly lower than the normal and the range less than usual. The maximum temperature wus about five degrees lower than usual. The minimum temperature came early in the month, and was more than three degrees lower than the normal for this feature.

The mean dewpoint and relative humidity were both nearly normal.

The total precipitation was about four-fifths of the normal, and more than one-half of it occurred during a single storm. A trace of snow was noted on the 25th, and high ground visible from this station was white with snow.

The amount of bright sunshine was considerably more than usual, and the number of cloudy days small.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 365. MAY, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing	30.14, 6th, 8 A
Minimum reduced to freezing	29.45, 18th, 9 A
Reduced maximum reading	30.44, 6th, 8 A
Reduced minimum reading	29.74, 18th, 9 A
Mean semi-daily reduced	29.980
Monthly range	0.70

***Air Temperature.** In Degrees Fahr.

Highest	89.0, 29th, 3 P
Lowest	33.0, 1st, 6 A
Mean hourly	57.6
Mean of means of max. and min.	57.4
Mean sensible (wet bulb)	51.7
Monthly range	56.0
Highest mean daily	69.4, 29th
Lowest mean daily	43.3, 11th
Mean maximum	69 4
Mean minimum	45.5
Mean daily range	23.9
Greatest daily range	41.0, 29th
Least daily range	5.5, 22d

Humidity.

Mean dew point	47.0
Mean force of vapor	.480
Mean relative humidity	70.8

Precipitation. In inches.

Total precipitation, in inches	6.20
Total snow, in inches	Trace
Number of days on which .01 inch or more rain fell	16

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	4290 m
Greatest daily movement	244m, 5th
Least daily movement	84m, 7th
Mean daily movement	138m
Mean hourly velocity	5.8 m

Maximum pressure per square foot, 5.5 lbs 33m per hour, 5th, 12M, W.N.W.

Maximum velocity for 5 minutes, 27m per hour, 5th, 12M, W.N.W.

Prevailing direction, Northwest.

Summary.

North	23 per cent
North Northeast	16 " "
South Southwest	10 " "
West Southwest	10 " "
West	10 " "
Other directions	31 " "

Weather.

Mean cloudiness observed	50 per cent
Total cloudiness recorded by the Sun Thermometer	171 hours = 38 per cent.
Number of clear days	15
Number of fair days	9
Number of cloudy days	7

Bright Sunshine.

Number hours recorded, 282 hrs.,= 62 per cent.

Rain, 1st, 2d, 4th, 5th, 7th, 9th, 10th, 11th, 12th 15th, 17th, 21st, 22d, 24th, 25th, 26th.

Frost, 1st.

Thunder and Lightning, 4th.

Gales, 35 miles or more per hour: None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum.	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.12	29.91	30 053	57.0	2 P	33.0	6 A	45.0	47.6	44.7	8.3
2	29 96	29.81	29.883	68.5	3:30 P	43.5	2 A	56.0	54.3	48.0	8.0
3	30.15	29.95	30 079	69.0	4 P	43.0	1:30 A	56.0	56.7	48.0	13.3
4	30 15	29 96	29.998	79.5	2 P	45.0	6 A	62.3	60.2	53.7	8.7
5	30.29	29.88	30.043	78.5	11 A	46.5	12 P	62.5	62.8	55.5	10.2
6	30.44	30.29	30.416	70.0	4 P	37.5	5 A	53.7	52.7	44.5	13.4
7	30.34	29.89	30.067	56.5	6 P	41.0	5 A	48.7	48.7	45.3	1:2
8	30.17	29.89	30.073	70.0	3:30 P	50.0	5 A	60.0	59.1	48.0	12.4
9	30.34	30.16	30.311	56.5	6 P	49.0	7 A	52.7	52.7	47.7	7.5
10	30 39	30.25	30.361	51 5	1 A	36.5	9:30 P	44.0	45.5	40.0	0.0
11	30 25	30 02	30.066	47.0	4 P	38 0	0 A	42.5	43.3	40.7	0.0
12	30.02	29.98	29.992	51.0	6 P	41.5	5 A	46.3	46.7	46.3	1.1
13	30.06	29 95	30.001	77.5	5:30 P	42 0	6 A	59.7	59.9	53 3	13.7
14	30 00	29.76	29.824	80.0	4 P	42.5	6 A	61.3	63 4	58.5	12.7
15	30.01	29 84	29 952	60.5	12 M	44.0	6 A	52.3	53.2	44 5	9.7
16	30.06	29.95	29.988	70.0	4 P	38.0	6 A	54 0	54.6	46 3	13.0
17	30.07	29.82	29.909	66.5	3 P	46.0	6 A	56.3	53.4	49.7	1.7
18	29.90	29 74	29 810	63.5	5 P	45.5	12 P	54.5	56 0	50.3	11.6
19	29.05	29.90	29.925	72.5	4 30 P	36.0	6 A	54.3	57.0	52 3	13.5
20	29.96	29.85	29.905	76.5	3 P	43.0	6 A	59.3	61 4	52.0	12.4
21	29.91	29 85	29.887	63.5	2:30 P	56.5	12 P	60.0	60.5	58.0	2.1
22	29.91	29.76	29 824	60.0	6 P	54 5	6 A	57 3	57.7	56.3	3.0
23	29.89	29.79	29.862	74.5	3 P	55 0	6 A	64.7	63.6	57.7	11.0
24	29.95	29 88	29.924	73.0	2 P	50.0	5:30 A	61.5	61.0	56.5	8.5
25	29.88	29 77	29 799	72.5	4 P	54 0	3 A	63.3	59.3	56 5	7 0
26	29.83	29 79	29.816	77.5	5 P	51.0	4:30 A	64.3	64.9	57.5	12.8
27	30.05	29 83	29.912	79.0	5 P	54.0	5:30 A	66.5	65.5	59.5	13.5
28	30.08	30.00	30 037	78.0	5-30 P	44.5	6 A	61.3	62.0	55.5	13.2
29	30.02	29.76	29.859	89.0	3 P	48.0	6 A	68 5	69.4	58.7	12.2
30	29.94	29.84	29.883	81 0	4 P	53.5	6 A	67.3	69 0	58.3	13.5
31	29.95	29.87	29.920	82.0	4 P	47.0	6 A	64.5	65 4	58.3	12.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	41.0	.328	77.0	W.	103	1.5	17	3 P	7 P	12 P	.16	
2	43.5	.391	74.0	W.	121	3.5	26	2 P	0 A	2 A	.15	
3	39.5	.448	52.5	W.N.W.	233	3.5	26	1 P				
4	50 5	.496	79.0	W S.W.	116	2.5	22	7 P	2 A	12 P	67	
5	51.0	.553	68.0	N.W.	244	5.5	33	12 M	3:30 P	4:30 P	.01	
6	34.5	.391	53 0	W.	137	1.0	14	8 P				
7	40.0	.379	66.0	S.S.W.	84	0.5	10	6 P	9:30A	3 P	.02	
8	37.5	.479	47.0	N.N.W.	184	1.5	17	10 A				
9	43.0	.391	71.5	N.N E	95	0.0	—	—	4:30A	3 P	.04	
10	35.0	.293	72.0	E.N.E.	151	1.5	17	2 P	10 A	12 P	.53	
11	36.5	.284	77.5	N.	231	1.5	17	3 P	0 A	12 P	.04	
12	45.0	.323	93.0	N.	151	0.5	10	2 A	0 A	12 P	.35	
13	44.5	.487	61.0	N.	130	2.0	20	12 M				
14	54.5	.594	72.5	S.	114	1.0	14	3 P				
15	43 5	.395	74.5	N.N.E.	130	1.0	14	4 A	1 A	12 P	.05	
16	43.0	.425	66.5	S S.E.	112	2.0	20	8 P				
17	48.0	.392	96 5	SS.W.	113	4.5	30	1 P	2:30A	11 P	.98	
18	44.0	451	56 5	W.N.W.	194	3.5	26	12 M				
19	45.5	.511	61.0	S.W.	112	1.5	17	12 M				
20	44.0	.529	56.0	S.	124	2.0	20	3 P				
21	56.5	.513	90.5	E.N.E.	91	0 5	10	6 A	7 A	12 P	2.37	
22	55 5	456	95 5	N.	88	0.0	—	—	0 A	12 P	.70	
23	56.0	.526	86.0	S.S.W.	187	4.0	28	7 P				
24	54.0	.514	81.0	W.S.W.	125	1.5	17	1 P	3 P	12 P	.08	
25	55.0	.506	85.0	N N.E.	89	3.5	26	5 P	4 P	5 P	.02	
26	52.0	.617	63 0	N.	187	2.5	22	11 A	11 P	12 P	.03	
27	56.0	.620	71.0	N.	128	2 0	20	1 P				
28	50 5	.558	66.5	N.	102	1.0	14	11 A				
29	52.0	.720	59 0	N.W.	99	2.0	20	2 P				
30	52.0	.697	54 0	N.N.E.	189	3.5	26	1 P				
31	53.5	.614	67.5	N.N.E.	126	1.0	14	10 A				

**Rain or melted snow at base of tower. *Included in following day.

REMARKS

The weather during the month was disappointing as a whole, although in many respects conditions were nearly normal. A cool period at the end of the first decade and an excessive rainstorm at the end of the second decade materially modified the character of the month from that shown by the means for the month. While rain was noted on more than one-half the days, the sunshine record was large. Planting was retarded by excessive moisture in many places and the seasonal progress was slow.

The records of the several weather elements, compared with the normals, show the following features: The barometer was rather steady and the range of pressure was comparatively small. The mean pressure was practically normal. The total wind movement was less than the normal and not a single gale was recorded on the pressure chart. Wind from the North to West points of the compass predominated.

The mean temperature was practically normal, and the maximum and minimum were both about two degrees above their respective normals. The minimum was registered on the first morning of the month, and the only frost noted occurred at that time. The maximum occurred near the end of the month and the greatest daily range was noted at that time.

The mean dew point and relative humidity were practically normal.

The total precipitation was about seventy per cent more than the normal and nearly one-half of it fell in a single storm.

The percentage of sunshine was the same as for the preceding month, and about one-half the days were clear.

J. E. OSTRANDER, Meteorologist.

A. L. CHANDLER, Observer.

BULLETIN No. 366. JUNE, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.22, 12th, 8 A
Minimum reduced to freezing,	29.50, 27th, 2 P
Reduced maximum reading	30.51, 12th, 8 A
Reduced minimum reading,	29.78, 27th, 2 P
Mean semi-daily reduced	30.127
Monthly range	0.73

***Air Temperature.** In Degrees Fahr.

Highest	101.0, 3d, 4 P
Lowest	41.5, 23d, 4 A
Mean hourly	68.4
Mean of means of max. and min.	68.3
Mean sensible (wet bulb)	61.8
Monthly range	59.5
Highest mean daily	78.9, 3d, 4th
Lowest mean daily	52.8, 9th
Mean maximum	81.8
Mean minimum	55.2
Mean daily range	26.2
Greatest daily range	43.5, 13th
Least daily range	5.5, 8th

Humidity.

Mean dew point	58.0
Mean force of vapor	.683
Mean relative humidity	73.9

Precipitation. In inches.

Total precipitation, in inches	1.09
Total snow, in inches	
Number of days on which .01 inch or more rain fell	6

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3456 m
Greatest daily movement	264m, 28th
Least daily movement	36m, 10th
Mean daily movement	115m
Mean hourly velocity	4.8 m
Maximum pressure per square foot, 4.5 lbs 30m per hour, 26th, 3P, S.S.W.	
Maximum velocity for 5 minutes, 18m per hour, 26th, 3P, S.S.W.	
Prevailing direction, South.	

Summary.

South	20 per cent
South Southwest	20 " "
Southwest	10 " "
South Southeast	10 " "
Other directions	40 " "

Weather.

Mean cloudiness observed	43 per cent
Total cloudiness recorded by the Sun Thermometer	131 hours = 29 per cent.
Number of clear days	14
Number of fair days	12
Number of cloudy days	4

Bright Sunshine.

Number hours recorded, 326 hrs. = 71 per cent.

Rain, 6th, 8th, 9th, 15th, 20th, 26th, 27th.

Gales. 35 miles or more per hour: None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.05	29.96	30.003	76.5	4 P	48.0	5:30 A	62.3	62.8	55 0	12.1
2	30.06	29.98	30.013	89.0	5 P	50 5	5:30 A	69.7	69.3	61.0	13.1
3	30.17	30 06	30.112	101.0	4 P	60.5	6 A	80.7	78.9	73.7	12.8
4	30.18	30.10	30.145	96.5	1 P	64.0	5:30 A	80.3	78.9	72.7	11.3
5	30.16	30.05	30.105	90.5	2 P	65.0	5 A	77.7	77.5	69.3	11.0
6	30.12	30 00	30.071	80.0	12 M	63 5	3 A	71.7	70.3	65.7	10.5
7	30.26	29.99	30.103	87.5	5:30 P	56 5	12 P	72.0	71.1	62 0	11.7
8	30.41	30.25	30.368	58.0	2 P	52.5	12 P	55.3	55.3	51.0	2.5
9	30.37	30.30	30.341	57.5	5 P	51.0	7 A	54.3	52.8	50.0	0.7
10	30 32	30.25	30.308	81.0	6 P	50 0	3 A	65.5	63.2	59.0	11.8
11	20.45	30.33	30.393	82.0	2 P	55.0	5 A	68 5	68.7	63.7	12.2
12	30.51	30.40	30.460	83 0	4 P	52 0	12 P	67.5	66 7	53 3	14.0
13	30'42	30.25	30.327	87.5	3:30 P	44.0	4 A	65.7	67.3	60.5	13.4
14	30.25	30 04	30.128	85.0	2 P	54 0	5:30 A	69.5	69.2	62.0	13.2
15	30.07	29.99	30 028	74.5	5-30 P	60.0	5 A	67.3	67 8	64.3	8.3
16	30.05	29.92	29.993	89.0	4 3c P	56.0	5:30 A	72.5	72.7	67.5	13.4
17	30 09	29.96	30.009	81.5	5 P	64.0	6 A	72.7	71 7	67.5	10.0
18	30.24	30.09	30.186	84.5	3:30 P	61.0	5:30 A	72 7	70.6	64 3	11.5
19	30.24	30 03	30.126	87.0	3 P	60.5	6 A	73 7	71.3	64.3	11.7
20	30.03	29.95	29 966	80.0	2 P	61.0	4 A	70.5	69 0	65.5	8.0
21	30.02	29 86	29.931	85.0	3:30 P	57.0	6 A	71.0	71.0	62.0	14.0
22	30.13	30 02	30.089	68.0	3 P	47.5	12 P	57.7	61.0	52 3	13.7
23	30.11	29.81	29.963	79.0	5 P	41.5	4 A	60.3	59.9	53.7	11.3
24	30 07	29.94	29.977	94.0	4 P	57 0	5 A	75.5	76.2	69.0	13.3
25	30.16	30.07	30 149	86 0	1 P	60.0	6 A	73.0	72 9	66.3	11.0
26	30.16	29.92	30 036	78.5	3:30 P	63.0	3 A	70.7	70.5	69.3	4.5
27	29.96	29 78	29.985	72.5	2:30 P	59.0	12 P	65.7	67.8	64.3	3 8
28	30.20	29 96	30.063	71.5	5 P	51.0	5:30 A	61.3	60.5	51.7	13.8
29	30.35	30 20	30.288	74.0	4 P	43.5	5 A	58.7	60.1	51.5	13.7
30	30.38	30.20	30.283	84.0	3:30 P	48.5	5 A	66 3	67.0	60.7	13.9

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	48 0	.582	58.0	W.S.W.	58	0.5	10	7 P				
2	55 5	.709	65.0	S.S.E.	48	0.0	—	—				
3	70.0	.940	79.5	S.W.	48	0.0	—	—				
4	70 5	.952	78.5	S.S.W.	51	0.5	10	5 P				
5	65.5	.869	74.5	S.	142	2.5	22	5 P				
6	63.5	.715	83 5	S.	210	2.5	22	1 P	3 P	11 P	.01	
7	58.5	.667	76.0	S.W.	114	2 0	20	5 P				
8	48 0	.423	79.0	E.N.E.	121	0.5	10	6 A	9 A	12 P	.01	
9	48.0	.392	86.0	E.	54	0.0	—	—	0 A	11 P	24	
10	57.5	.571	82.0	N.W.	36	0.0	—	—				
11	61.5	.691	78.5	E.N.E	61	0.0	—	—				
12	43.5	.581	51.5	S S.E.	99	0.5	10	11 A				
13	55.5	.688	64.5	S.S.E.	56	0.0	—	—				
14	58.0	.707	68.0	S.S.W.	98	1.0	14	6 P		*		
15	61.5	.708	77.5	S.	81	0.0	—	—	10 A	11:30A	T	
16	65.0	.817	75 0	S.	88	0.5	10	2 P				
17	65.0	.780	81.5	S.E.	75	0.0	—	—				
18	62.0	.718	76.5	S.	87	0.5	10	3 P				
19	62.0	.685	81.0	S.S.W.	163	3.0	24	2 P				
20	63.5	.726	80.0	E.	121	0.5	10	2 P	10 A	5 P	.02	
21	56.0	.698	82.5	N.N.W.	164	3.5	26	5 P				
22	43.5	.556	52.0	N.N.W.	263	3.0	24	2 P				
23	49.5	.540	68.5	S.	69	1.5	17	2 P				
24	65.0	.926	67.0	S.W.	80	0.5	10	2 P				
25	62.5	.817	70.0	S S.W.	125	2.0	20	3 P				
26	68.5	.764	89.5	S.S.W.	243	4.5	30	3 P	10 A	12 P	.07	
27	63.5	.650	91 5	W.	252	2.5	22	1 A	0 A	6 P	.74	
28	46.0	.487	64.0	N.N.E.	264	2.5	22	12 M				
29	44.5	.494	59 0	E.S.E.	114	0.5	10	9 A				
30	57.5	.631	76.0	S.S.W.	71	0.0	—	—				

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during June presented a marked contrast with that of the preceding month. The precipitation was unusually small and the only rainfall of any amount occurred near the end of the month. For more than a month from the 22d of May the precipitation was practically negligible as far as its effect on growing crops was concerned. A moderate storm on June 26th—27th furnished some relief, but rain was greatly needed when the month closed.

The early part of the month was marked by a period of high temperature—in fact, the first seven days were the hottest part of the month. The month as a whole was considerably warmer than usual.

The records of the several weather elements show the following features of interest: The mean barometer was exceptionally high for the time of year. Only six days show a mean pressure below 30 inches. The range of pressure was practically normal, and the maximum and minimum were both considerably above the normal. The total wind movement was slightly less than the normal, and no gales were registered. Most of the wind was from the southwest quadrant.

The mean temperature was about two and one-half degrees higher than usual, and the maximum reading was over 100 degrees for the first time in June at this station. The minimum temperature was about a degree above the normal. While a few cool nights were noted there was no approach to frost at this station.

The mean dew point and relative humidity were both slightly higher than their normal values.

The precipitation was about one-third of the normal amount and nearly all of it occurred in a single storm.

The amount of sunshine was much greater than usual and only four days were classed as cloudy.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 367. JULY, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.07, 9th, 4 A
Minimum reduced to freezing,	29.30, 11th, 1 A
Reduced maximum reading	30.37, 9th, 4 A
Reduced minimum reading,	29.59, 11th, 1 A
Mean semi-daily reduced	29.972
Monthly range	0.78

***Air Temperature.** In Degrees Fahr.

Highest	98.0, 4th, 1:30 P
Lowest	49.0, 12th, 5 A
Mean hourly	71.8
Mean of means of max. and min.	71.8
Mean sensible (wet bulb)	65.9
Monthly range	49.0
Highest mean daily	85.4, 5th
Lowest mean daily	61.0, 11th
Mean maximum	83.4
Mean minimum	60.2
Mean daily range	23.2
Greatest daily range	43.0, 1st
Least daily range	5.5, 22d

Humidity.

Mean dew point	63.5
Mean force of vapor	.772
Mean relative humidity	77.1

Precipitation. In inches.

Total precipitation, in inches	4.17
Total snow, in inches	
Number of days on which .01 inch or more rain fell	15

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3719 m
Greatest daily movement	295m, 22d
Least daily movement	35m, 17th
Mean daily movement	120m
Mean hourly velocity	5.0 m

Maximum pressure per square foot, 4.0 lbs 28m per hour, 9th, 2P, S.

Maximum velocity for 5 minutes, 21m per hour, 28th, 1P, S.

Prevailing direction, South Southwest.

Summary.

South	45 per cent
South Southwest	10 " "
Southwest	13 " "
North Northeast	10 " "
North	10 " "
Other directions	12 " "

Weather.

Mean cloudiness observed	45 per cent
Total cloudiness recorded by the Sun Thermometer	139 hours = 30 per cent.
Number of clear days	15
Number of fair days	12
Number of cloudy days	4

Bright Sunshine.

Number hours recorded, 323 hrs,= 70 per cent.

Rain, 5th, 6th, 7th, 10th, 11th, 15th, 16th, 18th, 19th, 21st, 22d, 23d, 24th, 26th, 31st.

Thunder and Lightning, 6th, 10th, 11th, 24th, , 26th.

Gales, 35 miles or more per hour : None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30·22	30.07	30.135	94.5	3:30 P	51.5	6 A	73.0	72.2	63.0	12.9
2	30.11	29.94	30 022	94.5	4 P	57.5	6 A	76.0	74.4	64.7	13.1
3	29.94	29.83	29.888	96.5	3 P	59.5	6 A	78.0	78.3	70.7	13.8
4	29.91	29.80	29.860	98.0	1:30 P	60.0	5:30 A	79.0	80.1	72.0	13.5
5	29 90	29.79	29.830	97.5	4 P	68.0	4:30 A	82.7	85.4	80.0	11.3
6	29.80	29.75	29.771	84.5	1 P	66.0	12 P	75.3	76.0	70.0	5.5
7	30.13	29 80	30.033	81.0	3 P	59 5	6 A	70.3	69.8	63.3	13.0
8	30.35	30.11	30.236	79.0	4 3c P	54.0	5:30 A	66 5	65.6	56.5	12.4
9	30.37	30.06	30.205	78.0	3 P	50.0	5:30 A	64.0	63.9	58.3	9.5
10	30 06	29.61	29.738	71.0	6 P	58.0	6:30 A	64.5	64.9	62.7	3.5
11	29.87	29.59	29 732	67.0	2 P	53 0	12 P	60.0	61.0	54.7	11.6
12	30.00	29.87	29.977	77.0	3:30 P	49.0	5 A	63 0	65 6	61.5	11.6
13	30 06	29.97	30.015	86.0	5 P	59.0	6 A	72 5	72 0	62.5	12.5
14	30.12	30.04	30 082	88.0	3:30 P	54.5	5:30 A	71.3	71.5	62.0	12.3
15	30.10	29 88	29.966	73.0	2 P	61.5	5 A	67.3	65.3	60 3	4.4
16	30.02	29.84	29.902	81.0	2:30 P	63 5	3 A	72 3	70.2	68.3	6.8
17	30.13	30.02	30.098	82.5	2 P	61.5	4 A	72.0	72.5	67.5	11.3
18	30.22	30.11	30.160	83.5	3 P	67.5	6 A	75.5	74.3	68.7	10.3
19	30.13	30.01	30.069	85.0	3-30 P	69.0	3 A	77.0	74 4	72.0	8.1
20	30.04	30 00	30 041	83 0	1 P	67.0	5 A	75.0	74.4	71.0	11.2
21	30.06	30.00	30.034	82.0	2:30 P	69 5	3 A	75.7	75.1	73.5	6.3
22	30.03	29 96	30.000	77.0	2 P	71.5	12 P	74.3	73.5	72.5	4.1
23	30.00	29 89	29.956	83.0	3 P	67.0	12 P	75 0	72.8	68.7	7·6
24	29.97	29.80	29 886	87.0	3 P	61.0	5:30 A	74.0	75.2	71.5	12.8
25	30.08	29.84	30.004	84.0	4 P	61.0	12 P	72.5	72.1	61.5	13 3
26	30.18	30 00	30.078	76 5	4 P	55.0	5 A	65.7	66.1	62.3	6.8
27	30.00	29 84	29 920	86.0	4:30 P	58 0	6 A	72.0	74.1	69.7	11.8
28	29.84	29.74	29 779	85.0	3 P	70.0	12 P	77.5	78.2	68.0	13.3
29	29 90	29 75	29.832	79.0	3 P	59.0	5:30 A	69.0	68 8	61.5	12.5
30	30.00	29.90	29.970	82.0	4 P	52.0	5:30 A	67.0	67.4	61.0	13.5
31	30.01	29.82	29.910	83.5	3 P	52 0	6 A	67 7	70.1	63.5	12.8

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	58.5	.752	66 5	S.	96	0.5	10	10 A				
2	61.0	.793	67.5	S.	67	0 0	—	—				
3	68 0	.912	75.5	S.W.	62	1.0	14	1 P				
4	69.0	.997	71.0	S.W.	44	0.5	10	3 P				
5	76.5	1.354	67.5	N.W.	77	2.0	20	8 P	10 P	12 P	.04	
6	78.5	.845	83.0	N.N.E.	83	0.0	—	—	0 A	8 P	64	
7	59.5	.711	72.0	N.N E	110	0 5	10	9 A	0 A	4 A	.10	
8	51.0	.589	63 0	N.	161	2.0	20	11 A				
9	54.5	.580	73 0	S.	185	4.0	28	2 P				
10	61.5	.608	91.0	S.S.W.	229	2.5	22	8 P	1 A	3 P	.51	
11	50.0	.524	68 0	W.	190	3.5	26	4 P	9 P	12 P	.21	
12	57 5	.671	70 5	S.W.	107	0.5	10	2 P				
13	57 5	.742	64 0	N.N.E.	63	0.0	—	—				
14	57.0	.741	64.0	S.	48	0.5	10	7 P				
15	58.0	.592	83 0	S.	178	2.5	22	5 P	9 A	12 M	.10	
16	68 0	.737	91.5	S.	94	1.0	14	1 A	2 A	8 A	.38	
17	65.5	.771	81.5	S.W.	35	0 0	—	—				
18	67.5	.788	84.5	S.	106	2.5	22	8 P	11 P	12 P	.02	
19	71.5	.837	91.5	S.	93	0.5	10	3 P	0 A	9 A	.93	
20	70.0	.827	88.5	S.	92	1.0	14	5 P				
21	72.5	.863	92.5	S.	160	3.5	26	1 P	8 A	12 P	.17	
22	72.0	.822	95.5	S.	295	3.0	24	0 A	0 A	5 P	.57	
23	68.5	.744	91.5	S.	91	1.0	14	1 A	2 A	11 A	.29	
24	69.5	.902	82.0	S.	99	1.0	14	3 P	10 P	11 P	.03	
25	56.5	.710	65.0	N.	122	1.0	14	1 P				
26	61.0	.605	88.5	S.	84	2.0	20	4 P	1 P	7 P	.16	
27	67.0	.891	75.0	S.S W.	102	1.0	14	12 M				
28	67.5	.971	70.0	W.	222	3.0	24	3 P				
29	57.5	.698	67.0	W.N.W.	211	2.5	22	2 P				
30	56.5	.649	72.0	N.	103	0.0	—	—				
31	60.5	.716	74 0	S.S.W.	110	1.0	14	3 P	11 P	12 P	.02	

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during July was nearly normal in most respects, although a general opinion to the contrary was prevalent. The large amount of south wind and the rather frequent rains were the main reasons for misjudging the general character of the month. The total precipitation, especially, was less than generally expected.

A comparison of the records of the several weather elements with their normals shows the following features: The mean barometer was practically normal and the range slightly more than usual. The maximum and minimum pressures show but small departures from their normals. The total wind movement was about a hundred miles more than usual, and the direction was from the south or nearly south a large part of the time. On but four dates was the total movement over two hundred miles, and not a single gale was recorded on the pressure chart.

The mean temperature was about one degree higher than the normal, and the first few days were the hottest part of the month. The maximum and minimum temperatures were both considerably higher than their normal values. The mean hourly temperature was above eighty degrees on but two days, the 4th and 5th.

The mean dew point and relative humidity were both considerably higher than usual, due largely to the south wind.

The total precipitation was nearly normal and the number of storms large, in fact, rain was recorded on about one-half the days of the month.

Notwithstanding the numerous rains the amount of sunshine recorded was abnormally large.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 368. AUGUST, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	29.99, 12th, 8 A
Minimum reduced to freezing,	29.35, 8th, 3 A
Reduced maximum reading	30.28, 12th, 8 A
Reduced minimum reading,	29.64, 8th, 3 A
Mean semi-daily reduced	29.944
Monthly range	0.64

***Air Temperature.** In Degrees Fahr.

Highest	88.0, 24th, 2 P
Lowest	43.0, 10th, 6 A
Mean hourly	65.8
Mean of means of max. and min.	65.8
Mean sensible (wet bulb)	60.9
Monthly range	45.0
Highest mean daily	73.0, 7th
Lowest mean daily	57.9, 27th
Mean maximum	77.0
Mean minimum	54.6
Mean daily range	22.4
Greatest daily range	36.5, 10th
Least daily range	5.0, 18th

Humidity.

Mean dew point	58.3
Mean force of vapor	.632
Mean relative humidity	77.3

Precipitation. In inches.

Total precipitation, in inches	4.81
Total snow, in inches	
Number of days on which .01 inch or more rain fell	11

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3210 m
Greatest daily movement	235m, 14th
Least daily movement	43m, 10th, 11th
Mean daily movement	104m
Mean hourly velocity	4.3 m

Maximum pressure per square foot, 3.5 lbs

26m per hour, 31st, 3P, S.

Maximum velocity for 5 minutes, 22m per hour, 8th, 12M, W.S.W.

Prevailing direction, Southwest.

Summary.

South	19 per cent
South Southwest	29 " "
Southwest	10 " "
Northwest	10 " "
Other directions	32 " "

Weather.

Mean cloudiness observed	44 per cent
Total cloudiness recorded by the Sun Thermometer	170 hours = 40 per cent.
Number of clear days	11
Number of fair days	12
Number of cloudy days	8

Bright Sunshine.

Number hours recorded, 259 hrs,= 60 per cent.

Rain, 1st, 5th. 6th, 13th, 14th, 18th, 19th, 21st, 24th, 27th, 30th, 31st.

Thunder and Lightning, 6th. 21st, 24th, 31st.

Hail, 24th.

Gales, 35 miles or more per hour: None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29 82	29.69	29.723	81.0	4 P	58.0	12 P	69.5	70.3	66.3	11.8
2	29.98	29.83	29.878	81.0	3 P	56.0	12 P	68.5	67.0	61.7	13.0
3	29.97	29.91	29 947	78.0	3 P	47.0	5 A	62.5	64.7	59.5	12.7
4	30.03	29.95	29.981	84.0	2 P	56.0	2:30 A	70.0	70.7	62.7	11.5
5	30.05	30.01	30 032	81.0	4 P	55 0	6 A	68,0	68.1	64.7	9.5
6	30 04	29.92	29.948	73.5	1 P	64.0	6 A	68.7	68.5	67.0	0 8
7	29 92	29.66	29.744	85.0	4 P	64.0	5 A	74.5	73 0	68.5	10.7
8	29 98	29 64	29 788	79.0	11 A	56 0	12 P	67.5	71.0	61.5	13.0
9	30.14	29.98	30.074	76 0	5 P	46.0	6 A	61.0	61.7	56.7	13 6
10	30.18	30.13	30.160	79.5	4 P	43 0	6 A	61.3	62.2	52.5	12.9
11	30.21	30.17	30.191	85 0	1 P	49.0	6 A	67.0	65.2	57.5	12.0
12	30.28	30.20	30.253	77.0	2 P	51.0	6 A	64.0	65.0	59.5	9.8
13	30.25	30.10	30.180	71.0	1 P	62.0	12 P	66.5	66.2	63.7	5.5
14	30.10	29.88	29.919	62.0	0 A	55.0	5 A	58.5	58.2	55 7	0.0
15	29.93	29.89	29.922	79.0	3 P	55.5	5 A	67.3	65.5	60.0	10.9
16	30.07	29.91	29.980	84.0	3 P	53.5	5:39 A	68.7	67.1	60.3	11.2
17	30.07	30.02	30.054	75.0	3 P	54.5	5 A	64 7	65.5	59.7	8.7
18	30 07	29 99	30 015	63 0	2 P	58.0	7 A	60.5	60.4	58.5	0.3
19	29 99	29 91	29.944	73 0	4 P	56.5	5 A	64.7	63.5	61.5	4.4
20	30.02	29.95	29.967	79.5	4 P	59.0	12 P	69.3	68.8	62.5	10.5
21	30.08	29.84	29.954	82 5	3 P	50 5	6 A	66.5	67.2	63.5	10.7
22	29.92	29.83	29 848	84.0	3 P	60.0	12 P	72.0	71.9	64.3	10.5
23	29.94	29.89	29.922	85.0	3:30 P	56.5	5 A	70.7	69.5	63 7	11.6
24	29.94	29 75	29.799	88.0	2 P	58.5	3:30 A	73 3	69.5	63 7	5.0
25	29.81	29 68	29.710	71.5	3 P	59.0	12 P	65.3	67.1	61.0	0.0
26	29.84	29.73	29 794	71.0	3 P	49 5	6:30 A	60.3	60.7	56 3	7.0
27	29 87	29 75	29.786	64.0	2:30 P	50 0	5 A	57.0	57.9	54.7	5 4
28	30.00	29.87	29.910	72.5	2:30 P	47.0	6 A	59 7	60.1	55 3	10.5
29	30 08	30.00	30.060	78 0	4 P	48 0	6 A	63 0	63 8	59 5	10.7
30	30.06	29.90	29.956	68.0	4 P	54.0	6 A	61.0	63 2	62 5	1.2
31	29.95	29.78	29.828	75.0	2 P	62.0	12 P	68.5	67.1	64 5	4 0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	65.5	.720	84.5	N.W.	157	1.0	14	6 P	0 A	5 A	.16	
2	57.5	.698	68.5	N.	214	2 0	20	2 P				
3	55.5	.620	70.0	W.	88	1.0	14	12 M				
4	58.5	.732	66.5	S.S W.	108	1.0	14	3 P				
5	63.0	.696	84.5	S S.W.	101	1.5	17	6 P	12 M	12 P	.04	
6	66 0	.705	90.0	S.	107	0 0	—	—	0 A	8 P	07	
7	66.5	.792	84 0	W.	84	1.0	14	11 P				
8	61.0	.756	54 5	N.W.	209	2.5	22	1 P				
9	52.5	.574	70.0	W.N.W.	75	1.0	14	2 P				
10	46.5	.522	62.5	S.	43	0.5	10	4 P				
11	53 5	.582	71.5	N.W.	43	0.5	10	3 P				
12	56.5	.599	74.5	S.S.W.	50	0.0	—	—				
13	61.5	.668	84.0	S.S.E.	109	0.0	—	—	10 P	12 P	.01	
14	55.0	.475	90.0	N.E.	235	2.0	20	10 A	0 A	7 P	.13	
15	57 0	.591	79.0	N.	70	0.5	10	4 P				
16	57 0	.626	76 0	S.S.W.	64	0.5	10	3 P				
17	56.5	.617	73.5	S.	120	1.5	17	3 P				
18	58 0	.502	94.5	E.N E	81	0.0	—	—	1 A	12 P	1.30	
19	60 5	.587	90.0	S.E.	72	0.5	10	9 P	0 A	10 P	.09	
20	60.0	660	78.0	W.S.W.	118	2.0	20	2 P				
21	61.5	.671	82.5	S.S.W.	53	1 0	14	9 P	8:30 P	9 P	T	
22	61.5	.710	77.5	S.W.	118	1.0	14	9 A				
23	60.0	.740	69.0	S.W.	88	0 5	10	11 A				
24	62.0	.663	84.0	S.	103	2 0	20	4 P	3 P	8 P	2.07	
25	58.0	.630	77.5	S.W.	116	1.5	17	1 P				
26	52.0	.557	70.5	S.S.W.	102	1.0	14	4 P				
27	51.0	.521	63.0	S.S.W.	123	1.5	17	4 P	10 A	2 P	.14	
28	51.0	.527	71.5	S.S.W.	104	1 0	14	1 P				
29	56.0	.604	72.5	S.	57	0.5	10	2 P				
30	61.5	.600	91.0	S.	82	1.0	14	11 A	2 P	8 P	.20	
31	64.0	.638	92.5	S.S.W.	116	3.5	26	3 P	2:30 P	4 P	.60	

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during August was somewhat cooler than usual and rainstorms were rather frequent. Nearly all the precipitation occurred after the middle of the month. The thunderstorm on the 24th was of unusual intensity and more than two inches of rain fell in about four hours. Accompanying the rain there was more or less hail and considerable damage was done in places. The total damage, however, was not as great as at first reported. Several fires were started by the lightning. Two other rather heavy rains occurred on the 18th and 31st.

Owing to the rather low temperature the corn crop did not advance rapidly and at the close of the month from ten days to two weeks of good weather is needed to mature the crop.

The various weather elements show the following features when compared with their normals: The mean barometer was rather low and fluctuations in pressure rather slow. The total wind movement was slightly less than the normal and no gales were registered on the pressure chart. An unusual amount of wind was from the Southwest quadrant.

The mean temperature was about two degrees lower than the normal, and no very high temperatures occurred. The maximum and minimum temperatures were nearly normal. The mean hourly temperature was above 70 degrees on only five days.

The mean dew point was nearly two degrees lower than the normal and the relative humidity a little higher than usual.

The total precipitation was about one-sixth more than the normal.

The amount of bright sunshine was rather large and the number of cloudy days rather small.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 369. SEPTEMBER, 1919

Meteorological Observations

AT THE

MASSACHUSETTS

AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 30.09, 27th, 8 A; 28th, 8 A.
Minimum reduced to freezing, 29.27, 12th, 4 A
Reduced maximum reading . 30.39, 27th, 8 A; 28th, 8 A.
Reduced minimum reading, 29.56, 12th, 4 A
Mean semi-daily reduced 30.016
Monthly range 0.83

***Air Temperature.** In Degrees Fahr.

Highest . . . . . 88.0, 7th, 4 P; 8th, 2 P
Lowest . . . . . 35.0, 27th, 7 A
Mean hourly 61.7
Mean of means of max. and min. 61.9
Mean sensible (wet bulb) 56.5
Monthly range 53.0
Highest mean daily 74.8, 8th
Lowest mean daily 50.2, 28th
Mean maximum 72.4
Mean minimum 51.4
Mean daily range 21.0
Greatest daily range 42.0, 28th
Least daily range 3.5, 3rd

Humidity.

Mean dew point 54.6
Mean force of vapor 525
Mean relative humidity 84.2

Precipitation. In inches.

Total precipitation, in inches 4.25
Total snow, in inches . . . . . .
Number of days on which .01 inch or more rain fell 12

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

Wind.

Total movement . . . . . 3244 m
Greatest daily movement 235m, 22d
Least daily movement 35m, 10th
Mean daily movement 108m
Mean hourly velocity . . . . . 4.5 m
Maximum pressure per square foot, 4.5 lbs 30m per hour, 25th, 3P, S.S.W.
Maximum velocity for 5 minutes, 20m per hour, 25th, 2P, S.S.W.
Prevailing direction, Southwest.

Summary.

South . . . . . 27 per cent
South Southwest . . . . . 17 " "
North . . . . . 13 " "
North Northeast . . . . . 13 " "
West . . . . . 10 " "
Other directions . . . . . 20 " "

Weather.

Mean cloudiness observed . . . . 54 per cent
Total cloudiness recorded by the Sun Thermometer . . 194 hours = 52 per cent.
Number of clear days 9
Number of fair days 9
Number of cloudy days 12

Bright Sunshine.

Number hours recorded, 179 hrs,= 48 per cent.
Rain, 2d, 3d, 7th, 9th, 10th, 11th, 12th, 15th, 16th, 20th, 22d, 23d, 24th.
Thunder and Lightning, 9th, 11th, 24th.
Frosts, 18th, 27th, 28th.
Gales, 35 miles or more per hour: None.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean, Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.14	29.95	30.058	72.5	2 P	58.0	6 A	65.3	65.3	62.7	5.0
2	30.17	30.08	30.126	66.0	4 P	61.0	7 A	63.5	64.0	63.3	0.0
3	30.08	29 84	29.888	65.0	3 P	61.5	7 A	63.3	63.3	62.7	2.3
4	30.15	29.88	29.998	77.0	4 P	54.0	12 P	65 5	64.2	59.0	10.7
5	30.24	30.08	30.170	74.0	4 P	41 5	7 A	58.0	58.9	53.5	11.4
6	30.18	30.00	30 085	82 0	2:30 P	45.5	7 A	63.7	65.0	60.7	8.7
7	30.02	29.97	30.022	88.0	4 P	64.0	6 A	76.0	74.7	69.3	8.8
8	29.97	29 84	29.891	88.0	2 P	58.5	12 P	73 3	74 8	70.0	9.7
9	30.10	30.01	30.078	58.5	0 A	52 0	7 A	55.3	53 8	52.5	0.0
10	30 04	29 89	29 960	68 0	3 P	52.5	3 A	60.3	59.8	58.5	0.0
11	29.89	29.60	29.656	77.0	3:30 P	60.0	4 A	68.5	64 6	62.0	0.0
12	29 84	29.56	29 658	68.0	3 P	57.0	12 P	62 5	61.5	57.3	1.0
13	30.09	29.84	30.016	72.0	3 P	50.0	6 A	61.0	60.5	54.5	11.8
14	30.12	30.04	30.082	74.0	2:30 P	47.5	5 A	60 7	60 0	54.0	8.0
15	30.13	30 07	30.117	59.0	0 A	52.0	12 P	55 5	54 0	52.0	0.0
16	30 07	29.87	29.960	63 0	3 P	52.0	0 A	57.5	56.8	54.3	0.0
17	30.00	29 81	29.866	71.5	2 P	48.0	12 P	59 7	59.5	51.5	10.5
18	30.17	30.00	30.126	69.0	4 P	35.5	6:30 A	52.3	52.3	43.5	11.1
19	30.22	30.11	30.180	72.0	1 P	45.0	6 A	58.5	57.3	51.0	8.5
20	30 11	29.99	30 028	79.5	3 P	56.0	0 A	68.3	66 5	63.3	4.5
21	30.08	29 98	30.026	74.0	4 P	63.0	3 A	68.5	68.0	65.7	0.5
22	29.98	29.82	29.894	71.0	4 P	66.0	5 A	68.5	69 0	67 5	0.0
23	29.94	29.80	29 892	69.0	0 A	51.0	12 P	60.0	58.8	56.0	0.3
24	29.94	29 76	29 885	71.0	4 P	42.0	6:30 A	56.5	54 6	48.0	10.4
25	29.89	29 67	29 778	77.5	3 P	54 5	7 A	66.0	63.0	54.5	9.1
26	30.24	29.89	30.114	66.5	3 P	45.0	12 P	55.5	55.7	48 5	11.0
27	30.39	30.24	30.377	68.0	4 P	35 0	7 A	51.5	50.2	43 7	10.8
28	30.39	30 27	30.353	78.5	4 P	36 5	6 A	57 5	56.2	49.7	10.2
29	30.32	30.09	30.218	76 0	3 P	45 5	4 A	60.7	59.2	55.0	7.7
30	30.18	29.99	30.088	75.0	1-30 P	51.0	12 P	63.0	60 5	52.3	6 7

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	62.0	.660	91.0	N.N E.	70	0 0	—	—				
2	61.5	.586	93.0	N.N.E.	105	0.0	—	—	0 A	12 P	.63	
3	62.5	.583	96.0	N.	88	0.5	10	9 A	0 A	6 P	1.40	
4	57.0	.555	84.0	N.	106	1.0	14	1 P				
5	51.0	.462	82 5	S.W.	81	1.5	17	4 P				
6	65.5	.644	78.5	S.	109	1.0	14	3 P				
7	67.5	.837	80.5	S.	96	0 5	10	2 P	6 A	7 A	T	
8	67.5	.872	78.0	W.S.W.	124	1.5	17	9 P				
9	51.5	.402	94.0	N.N.E.	80	0.0	—	—	3 A	4 P	1 18	
10	58.0	.512	94.0	W.N.W.	35	0.0	—	—	5 P	12 P	.05	
11	61.5	.576	94.5	S.	73	0.0	—	—	0 A	12 P	.28	
12	56 0	.498	90.0	W.	120	2 0	20	3 P	0 A	7 P	.09	
13	50.5	.503	72.5	N.W.	185	2.0	20	10 A				
14	51.0	.489	77.0	S.S.W.	58	0.5	10	3 P				
15	51.0	.410	91.0	N.N.E.	47	0.0	—	—	4 A	10 P	.20	
16	53 0	.447	90.0	S.	81	0.5	10	4 P	9 A	12 M	.02	
17	47 0	.452	71.0	W.	97	1.0	14	1 P				
18	37.0	.345	64 5	S.E.	82	1.0	14	3 P				
19	47.5	.433	76.0	S.	186	2.0	20	2 P				
20	62.0	.644	88.5	S.	191	1.5	17	6 A	3 A	7 A	.01	
21	65.0	.685	89.0	S.	88	1.5	17	10 P				
22	67.0	.715	92.5	S.S.W.	235	2.5	22	9 A	8 A	12 P	.24	
23	54.5	.490	88.5	N.	100	1 0	14	12 M	0 A	5 P	.19	
24	46.5	.377	89.5	N.W.	89	1.5	17	6 P	5 P	7 P	.16	
25	51.5	.492	78.0	S.S.W.	222	4.5	30	3 P				
26	44.5	.395	75 0	N.	103	0.0	—	—				
27	41.0	.316	84.0	S.S.W.	65	0 0	—	—				
28	48.5	.405	89.5	S.	46	0.0	—	—				
29	52.5	.488	84.0	S.S W.	93	2.5	22	3 P				
30	47.5	.478	70.0	W.	189	1.5	17	3 P				

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during the month was rather gloomy on the whole, and rainstorms were quite numerous. While most of the storms were small, the two storms early in the month were unusually heavy, and over three-fourths of the total precipitation occurred during the first third of the month. There was considerable cloudiness without precipitation, so that the total cloudiness was rather high. Only a few light frosts were noted, and practically no damage resulted. At the close of the month the transition to Autumn was practically complete.

A comparison of the records of the several weather elements with their respective normals shows the following features of interest; The mean barometer was slightly lower than the normal, while the range of pressure was nearly the usual amount. The maximum and minimum pressures were both lower than their normals. The total wind movement was slightly less than usual, and no gales were recorded. The percentage of south wind was large.

The mean hourly temperature varied but little from the normal, and the minimum temperature was not quite as low as usual. The mean hourly temperature on the 9th was 21 degrees lower than on the 8th—an exceptionally rapid change.

The mean dew point was higher than the normal and the relative humidity unusually high.

The total precipitation was but little greater than the average value, and has been commented on above.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 370. OCTOBER, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.30, 30th, 8 A
Minimum reduced to freezing,	29.26, 28th, 3 P
Reduced maximum reading	30.61, 30th, 8 A
Reduced minimum reading,	29.55, 28th, 3 P
Mean semi-daily reduced	30.123
Monthly range	1.06

***Air Temperature.** In Degrees Fahr.

Highest	81.5, 3d, 1 P
Lowest	27.0, 30th, 4 A
Mean hourly	51.2
Mean of means of max. and min.	51.6
Mean sensible (wet bulb)	47.1
Monthly range	54.5
Highest mean daily	65.2. 3d
Lowest mean daily	34.8, 30th
Mean maximum	62.2
Mean minimum	41.1
Mean daily range	21.1
Greatest daily range	36.0, 7th, 9th
Least daily range	7.0, 4th

Humidity.

Mean dew point	44.6
Mean force of vapor	.378
Mean relative humidity	83.8

Precipitation. In inches.

Total precipitation, in inches	1.81
Total snow, in inches	
Number of days on which .01 inch or more rain fell	13

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	2914 m
Greatest daily movement	199m, 11th
Least daily movement	19m, 30th
Mean daily movement	94m
Mean hourly velocity	3.9 m

Maximum pressure per square foot, 8.5 lbs 41m per hour, 28th, 3P, W.

Maximum velocity for 5 minutes, 24m per hour, 28th, 3P, W.

Prevailing direction, Southwest.

Summary.

South	19 per cent
South Southwest	16 " "
South Southeast	10 " "
West	10 " "
Northwest	10 " "
Other directions	35 " "

Weather.

Mean cloudiness observed	57 per cent
Total cloudiness recorded by the Sun Thermometer	193 hours = 57 per cent.
Number of clear days	4
Number of fair days	12
Number of cloudy days	15

Bright Sunshine.

Number hours recorded, 148 hrs.,= 43 per cent.

Rain, 2d, 3d, 6th, 9th, 11th, 16th, 17th, 21st, 26th, 27th, 28th, 30th, 31st.

Frosts, 8th, 9th, 13th, 29th.

Hail, 30th

Gales. 35 miles or more per hour: 41m, 28th, W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean, Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.25	30.14	30.224	64.5	4 P	42.5	12 P	53.5	50.7	45 3	7.0
2	30.20	29.88	30.074	56.0	12 P	42.5	0 A	49.3	49.7	49.0	0.0
3	30.07	29 81	29.904	81.5	1 P	56.0	0 A	68.7	65.2	58.0	7.0
4	30.11	30.02	30.082	61.0	12 P	54.0	6 A	57.5	57.6	56.3	0 0
5	30.02	29.90	29.974	68.5	5 P	59.5	2 A	64.0	63.7	62.3	1.5
6	29.90	29.69	29.809	74.0	3 P	47.0	12 P	60.5	65.0	59.7	2.0
7	30.16	29 88	29.953	67.0	2 P	31.0	12 P	49.0	49.6	41.5	10.5
8	30.40	29 88	30.380	58.0	4:30 P	31.0	6 A	44.5	40.5	34.0	10.5
9	30.44	30.20	30.349	64.0	2 P	28.0	7 A	46.0	48.2	45 7	7.5
10	30.20	29 92	30.051	79.0	4 P	59.0	0 A	69.0	62.5	62.5	8.0
11	29.98	29.91	29.943	75 0	9:30 A	50.0	12 P	62.5	62.1	57.7	5.5
12	30.17	29 98	30.021	50.0	0 A	35 0	12 P	42.5	45.3	39.5	2.1
13	30 37	30.17	30.346	61.0	3 P	28.0	6 A	44.5	43 6	36.0	10.2
14	30.33	30.05	30.200	52.0	6 P	37.0	6 A	44.5	44.4	37.7	0.0
15	30.12	30.03	30.116	68 0	4 P	48.5	0 A	58.3	56.6	53.7	6.0
16	30.10	29 77	29.943	66.0	6 P	54.0	6 A	60.0	59.5	58.5	0.0
17	30 14	29.77	30.043	64.0	3 P	39.5	12 P	51 7	53 5	45.0	8.7
18	30 28	30.14	30.117	60.0	3 P	33.0	7 A	46.5	45.2	38.5	10.0
19	30.20	30.03	30.117	64.0	2 P	32.5	6 A	48.3	47.5	43.3	7.0
20	30.40	30 20	30.397	48.5	3 P	37.0	7 A	42.7	42 3	37.0	2.0
21	30.37	29.97	30.175	52.0	11 P	34.0	1 A	43 0	42.1	44.0	0.0
22	30.21	29.96	30.065	58.0	3 P	41.0	12 P	49.5	51.5	47.3	7.2
23	30.34	30.21	30.278	57.0	3 P	32.0	7 A	44.5	45.4	42.0	6.3
24	30.27	30.20	30.230	62.0	3 P	41.0	12 P	51.5	50 5	44 0	8.0
25	30.38	30.10	30.254	61.0	4 P	40.0	0 A	50.5	49.9	44.5	5.2
26	30.10	29.95	29 985	60.5	1 P	50.0	2 A	55.3	56.3	55.0	0 0
27	30.04	29.95	30 030	62.0	2 P	50.0	6:30 A	56.0	55.5	53.3	2.6
28	30.00	29.55	29 815	74.0	2-30 P	45.0	12 P	59.5	54.4	47.3	3.0
29	30.51	30.00	30 392	51.0	3:30 P	30 0	12 P	40.5	41.1	33.3	8.5
30	30.61	30.33	30.529	41.0	4 P	27.0	4 A	34 0	34.8	33.3	0.0
31	30.33	29.73	29.906	67.0	3:30 P	38.0	0 A	52.5	54.5	55.0	1.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	42.5	.338	81.0	W.N.W.	82	0.0	—	—				
2	47.5	.370	90.0	S.	50	0.0	—	—	9 A	8 P	.21	
3	55.5	.537	84.0	S.S E.	72	0.0	—	—	3 A	1 P	.01	
4	55.5	.480	92.5	S.S.W.	51	0.0	—	—				
5	61.5	.581	93.5	S.	46	0.0	—	—				
6	57.5	.578	82.5	S.S.E.	176	3.5	26	5 P	2 A	1 P	.07	
7	34.5	.343	63.0	N.N.W.	175	4.0	28	4 P				
8	27.5	.239	63.0	S.E.	78	0.0	—	—				
9	43.5	.331	93.0	S.S.W.	132	3.0	24	11 P	4 P	12 P	.26	
10	61.0	.625	87.0	S.S.W.	185	2.0	20	3 P				
11	56.0	.534	88.0	N.W.	199	3.5	26	11 A	9 P	11 P	.01	
12	34.5	.279	73.5	N.N.E.	111	0.0	—	—				
13	29.0	.250	65 0	W.	57	0.0	—	—				
14	41.0	.293	90 5	S.W.	37	0.0	—	—				
15	57 0	.513	93.5	S.	49	0.0	—	—				
16	58.0	.509	97.0	S.S.W.	65	2.0	20	12 M	11 A	12 P	.39	
17	42.0	.337	79.5	N.W.	173	0.0	—	—	0 A	2 A	.06	
18	36 0	.257	84 0	S.	51	0.5	10	3 P				
19	40.0	.311	84.0	S.S.W.	74	1.0	14	3 P				
20	33 0	.246	76.0	N.E.	110	0.5	10	2 A				
21	42.5	.308	92.0	W.	32	0.5	10	9 P	4 P	11 P	.06	
22	45.5	.352	88.0	W.	150	2.5	22	11 A				
23	40.0	.290	89.5	S.	30	0.0	—	—				
24	41.0	.327	79 0	S.S.E.	40	0.0	—	—				
25	42.5	.331	85.5	W.S.W.	57	0.0	—	—				
26	53.5	.465	91.0	S.	148	1.5	17	5 A	12 M	3 P	.06	
27	52.0	.430	89.5	N.	53	0.0	—	—	7 P	12 P	.06	
28	41.5	.382	73.0	N.W.	178	8.5	41	3 P	0 A	1 P	.48	
29	27.0	.219	67.0	N.N.E.	154	2.0	20	4 A				
30	31.0	.201	88.5	N.N.W.	19	0.0	—	—	3 A	1 P	.02	
31	54 0	.469	92.5	S.E.	80	0.5	10	10 A	2 A	12 P	.12	

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during October was generally gloomy, owing to the large amount of cloudiness and considerable fog. While precipitation occurred on nearly half the days the total amount was small. Much of the wind was from the southwest quadrant. Changes in temperature were rather rapid at times, although the extremes for the month were not unusual.

The records of the several weather elements compared with the normals show the following features: The mean barometer was high even for October—a month with a high normal pressure. Both the maximum and minimum pressures were considerably above their normals. The range of pressure was about the usual amount. The total wind movement was only about 70 per cent of the normal and there were no days showing a very large movement. Only one gale was registered and that was of moderate intensity and of rather short duration.

The mean hourly temperature was about one degree higher than usual, and the mean of maximum and minimum readings slightly more. The maximum temperature came early in the month and was 2½ degrees higher than the normal. The minimum temperature was about 4 degrees higher than the normal.

The mean dew point was several degrees higher than usual and the relative humidity several points above the normal.

The total precipitation was nearly 50 per cent of the normal and occurred in numerous small rains. Early in the morning of the 30th there was a storm of sleet and hail for a short period.

Both the observed cloudiness and the record of the sunshine recorder show that the month was considerably deficient in sunshine.

J. E. OSTRANDER, Meteorologist.

G. A. SMITH, Observer.

BULLETIN No. 371. NOVEMBER, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.21, 10th, 7 A
Minimum reduced to freezing,	29.08, 30th, 5 A
Reduced maximum reading	30.53, 10th, 7 A
Reduced minimum reading,	29.37, 30th, 5 A
Mean semi-daily reduced	30.084
Monthly range	1.16

***Air Temperature.** In Degrees Fahr.

Highest	70.0, 1st, 1 P
Lowest	17.0, 21st, 7 A
Mean hourly	39.6
Mean of means of max. and min.	40.1
Mean sensible (wet bulb)	35.6
Monthly range	53.0
Highest mean daily	61.7, 1st
Lowest mean daily	26.4, 20th
Mean maximum	48.5
Mean minimum	31.6
Mean daily range	16.9
Greatest daily range	35.0, 10th
Least daily range	7.5, 26th

Humidity.

Mean dew point	31.5
Mean force of vapor	.237
Mean relative humidity	79.1

Precipitation. In inches.

Total precipitation, in inches	6.20
Total snow, in inches	Trace
Number of days on which .01 inch or more rain fell	10

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	5207 m
Greatest daily movement	436m, 6th
Least daily movement	27m, 29th
Mean daily movement	174m
Mean hourly velocity	7.2 m
Maximum pressure per square foot, 8.0 lbs 40m per hour, 30th, 8A, S.S.W.	
Maximum velocity for 5 minutes, 30m per hour, 30th, 3A, S.S.W.	
Prevailing direction, West.	

Summary.

South	13 per cent
North	13 " "
South Southwest	13 " "
North Northeast	10 " "
West	10 " "
West Northwest	10 " "
Other directions	31 " "

Weather.

Mean cloudiness observed	53 per cent
Total cloudiness recorded by the Sun Thermometer	170 hours = 58 per cent.
Number of clear days	6
Number of fair days	9
Number of cloudy days	15

Bright Sunshine.

Number hours recorded, 123 hrs,= 42 per cent.

Rain, 2d, 1st, 2d, 5th, 11th, 12th, 13th, 19th, 22d, 26th, 27th, 29th, 30th.

Snow, 5th, 19th.

Gales. 35 miles or more per hour: 35m, 20th, N.W.; 40m, 30th, W.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.73	29.57	29.679	70.0	1 P	53.0	12 P	61.5	61.7	58.0	3.7
2	30.07	29.56	29.848	57.0	1:30 P	34.0	12 P	45.5	46.3	45.7	6.8
3	30.20	30.07	30.162	48.5	2 P	26 5	6 A	37.5	37.0	31.5	7.0
4	30.16	29.78	30 028	47.5	2 P	37.0	6 A	42.3	43.0	39 3	3.2
5	29.78	29 54	29.629	45.0	0 A	35 0	9 A	40.0	39.0	34.0	0.0
6	30.16	29.71	30.062	44.5	1 P	36.0	12 P	40.3	39.3	33 7	3.8
7	30.30	30.16	30.279	45.0	3 P	33.0	6 A	39.0	38.2	34 7	1.1
8	30.42	30.30	30.398	50.0	2:30 P	34.0	6 A	42.0	38.7	32.7	5.9
9	30 44	30.35	30.434	53.0	3 P	27 5	6 A	40.3	37.0	32.3	8.7
10	30.53	30.36	30.455	58.0	3 P	23 0	7:30 A	40.5	37.6	31.0	8.1
11	30 36	30.25	30.342	49.0	5 P	30 0	5 A	39.5	41 8	42 3	0.0
12	30.34	30.10	30 235	35.0	3:30 P	47.0	6 A	51.0	50.9	49.7	0 0
13	30.10	29.97	30.051	54.0	6:30 A	34.0	12 P	44.0	44.2	42.5	0.7
14	30.16	30.04	30.126	42.0	2 P	30.0	8 A	36.0	34.5	28.7	8.7
15	30.40	30.05	30.332	40.0	2 P	26 0	12 P	33.0	32.3	28 5	7.5
16	30.43	30.24	30.362	46.5	3 P	21.0	7 A	33.7	33.3	27.0	6.9
17	30.24	29.97	30.153	56.0	2-30 P	35.0	6 A	45.5	43.8	39.0	5.9
18	29 97	29 58	29.700	58 0	2:30 P	36.0	12 P	47.0	44.8	40.2	5.6
19	29.84	29 57	29 715	37.0	0 A	27.0	12 P	32.0	32.8	28.5	2.7
20	30 46	29 84	30.252	33.0	3 P	22.0	8 A	27.5	26.4	22.0	8.4
21	30 50	30 22	30.406	51.0	1:30 P	17.0	7 A	34.0	34.7	29 0	5 9
22	30.22	29.58	29.894	49 0	3:30 P	39.0	2 A	44.0	43.8	39.7	0.0
23	29.64	29.50	29 579	49.0	1:30 P	33.0	12 P	41.0	40.4	32.5	5.0
24	30.01	29 63	29.840	46.5	2 P	25.5	8 A	36.0	35.6	28.3	8.5
25	30.16	29.96	30 075	48.0	4 P	29.0	7:30 A	38.5	40 0	36.0	1.7
26	30.11	30.01	30 095	45 0	0 A	37.5	12 P	41.3	41.5	41.0	0.0
27	30.29	30.02	30.222	41.0	3 P	33.0	12 P	37 0	37.7	36.0	0.0
28	30.49	30.29	30.475	33.0	0 A	24.5	9 A	28.7	29.2	27.0	0.0
29	30.34	29 55	30.106	44.0	12 P	30.0	0 A	37.0	33.8	33.0	0.0
30	29.91	29.37	29.590	61.0	2:30 A	34.0	12 P	47.5	49.3	43.7	7.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	56.5	.517	89 0	N.W.	86	0.5	10	10 A	0 A	12 P	.38	
2	34.5	.272	74.0	N.	264	3.0	24	10 A	0 A	10 A	.93	
3	27.5	.202	77.0	N.E.	117	1.0	14	6 P				
4	35.5	.267	78.0	E.S.E.	103	1.0	14	2 P				
5	29 0	.221	74.0	N.N.W.	308	4.5	30	7 P	2 A	12 M	.97	T
6	27.0	.227	64.0	N.	436	4.5	30	1 P				
7	29.5	.227	72.5	N.N.E.	205	2.0	20	8 A				
8	28.0	.209	75 0	N.N.E.	97	2.0	20	12 P				
9	29.5	.196	83.0	N.	150	0.5	10	11 A				
10	25.5	.200	73.5	S.S.W.	38	0.0	—	—				
11	41.5	.278	94.0	S.	52	0.5	10	5 P	2 A	12 P	19	
12	48.5	.376	92.0	S.	66	1.5	17	4 P	0 A	12 P	.24	
13	41.0	.298	90.5	N.N.W.	130	2 0	20	10 P	0 A	12 P	.62	
14	22 5	.180	67.5	W.	186	1.5	17	2 A				
15	24.5	.169	78 5	W.	164	1.5	17	9 A				
16	22.5	.175	75.5	S.	109	1.5	17	11 A				
17	35 0	.271	77.5	S.	159	2.0	20	2 P				
18	38.5	.263	86.0	S.S.W.	213	2.0	20	10 A				
19	22.0	.180	68.0	W.N.W.	217	3.0	24	7 P	6 P	7 P		T
20	17.5	.130	74.5	W.N.W.	394	6.0	35	1 A				
21	20.5	.198	61.5	S.S.W.	106	0.5	10	5 P				
22	34.5	.285	71.5	S.S.W.	224	3.0	24	8 P	10 P	11 P	T	
23	26.5	.214	68.5	S.W.	241	4.0	28	12 M				
24	21.5	.181	67.0	W.	109	1.5	17	2 P				
25	33 0	.232	84 5	S.W.	236	5.0	32	6 P				
26	41.0	.257	100.0	E.	97	0.0	—	—	8 A	12 P	1.59	
27	33.0	.217	86.5	N.N.E.	161	1.0	14	6 A	0 A	4 A	.47	
28	26.0	.152	94 5	N.	135	1 0	14	1 A				
29	32 0	.193	95.0	S.E.	27	0.0	—	—	1 P	12 P	.56	
30	40.0	.336	79.0	W.N.W.	377	8.0	40	8 A	0 A	4 A	.25	

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during November was more stormy than usual, and the change in weather conditions rather rapid in several instances Several heavy rainstorms occurred, and the precipitation during the storm of the 26th—27th was more than two inches. Only traces of snow were noted. The amount of sunshine was small and the last week of the month was especially gloomy. While thin ice formed on several dates no especially cold weather occurred, and the ground was practically free from frost when the month closed.

The records of the several weather elements show the following features: The mean barometer was higher than the normal and the range of pressure slightly less than usual. The rapid fall in pressure during the storm on the 29th and the rise on the 30th after the storm were noticeable features. The wind movement was considerably more than the normal and the wind direction more variable than usual.

The mean hourly temperature showed that the month was slightly warmer than usual, and both the maximum and minimum temperatures were several degrees above their normals. A rise in temperature of nearly twenty degrees in two hours near midnight of the 29th was a very abnormal feature.

The mean dew point was about a degree above the normal and the relative humidity several points higher than usual.

The total precipitation was nearly twice the normal and nearly all of it occurred either during the first five days of the month or the last five days of the month.

The amount of sunshine was nearly normal, although one-half the number of days were recorded as cloudy or overcast.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

BULLETIN No. 372. DECEMBER, 1919

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.35, 11th, 11 A
Minimum reduced to freezing,	29.10, 7th, 1 P
Reduced maximum reading	30.67, 11th, 11 A
Reduced minimum reading,	29.41, 7th, 1 P
Mean semi-daily reduced	30.111
Monthly range	1.26

***Air Temperature.** In Degrees Fahr.

Highest	54 0, 13th, 3 P
Lowest	−9.0, 18th, 7 A
Mean hourly	23.4
Mean of means of max. and min.	23.2
Mean sensible (wet bulb)	21.5
Monthly range	63.0
Highest mean daily	48.3, 13th
Lowest mean daily	−0.7, 18th
Mean maximum	31.7
Mean minimum	14.7
Mean daily range	17.0
Greatest daily range	29.5, 4th
Least daily range	3.0, 9th

Humidity.

Mean dew point	18.6
Mean force of vapor	.132
Mean relative humidity	87.1

Precipitation. In inches.

Total precipitation, in inches	1.48
Total snow, in inches	4¾
Number of days on which .01 inch or more rain fell	12

Days of sleighing, none.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	4022 m
Greatest daily movement	477m, 25th
Least daily movement	3m, 18th
Mean daily movement	130m
Mean hourly velocity	5.4 m

Maximum pressure per square foot, 13.0 lbs 51m per hour, 25th, 10A, N.

Maximum velocity for 5 minutes, 36m per hour, 25th, 9A, N.

Prevailing direction, West Northwest.

Summary.

North west	23 per cent
West	19 " "
West Northwest	13 " "
North	13 " "
North Northeast	10 " "
Other directions	22 " "

Weather.

Mean cloudiness observed	39 per cent
Total cloudiness recorded by the Sun Thermometer	163 hours = 57 per cent.
Number of clear days	5
Number of fair days	13
Number of cloudy days	13

Bright Sunshine.

Number hours recorded, 120 hrs,= 43 per cent

Rain, 6th. 8th 9th, 12th, 13th, 14th.

Snow, 6th, 7th, 11th, 14th, 15th, 17th, 21st, 24th, 26th, 30th.

Hail, 12th.

Gales, 35 miles or more per hour: 50m, 10th, N.W.; 35m, 15th, W.: 51m, 25th. N.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.35	29.91	30.282	38 0	3 P	30 0	8 A	34.0	33.1	29.0	4.0
2	30.35	30.07	30.207	40.0	3 P	25.0	12 P	32.5	32.2	30.8	1.8
3	30.45	30.27	30.444	25.0	3 P	11.0	12 P	18.0	17.2	13.0	7.0
4	30 48	30.26	30.381	34.0	3 P	4 5	7 A	19.3	17.6	23.3	7.7
5	30.26	30.04	30.162	33.0	10 P	13.0	2 A	23.0	22.4	20.0	1.0
6	30.27	29.71	30.084	34.0	1:30 P	20.0	7 A	27.0	27.9	24.5	4.5
7	29.86	29.41	29.604	40.0	10 P	31.0	3 A	35.5	33.4	32 3	0.0
8	30.34	29.87	30.207	40.0	12 M	33.0	12 P	36.5	36.3	33.5	1.8
9	30.34	29.99	30.263	36.0	12 P	33.0	0 A	34 5	34.1	33.5	0 0
10	30.53	29 81	30.186	46.0	6 A	19.0	12 P	32 5	30.4	27.5	3.5
11	30.67	30.46	30.577	25.0	12 M	16.0	7 A	20.5	20.1	17 3	6.0
12	30.46	30.00	30.170	39.0	9 P	22.0	0 A	30 5	31.5	31.3	0.0
13	30.00	29.74	29.859	54.0	3 P	39 0	0 A	46.5	48.3	48.0	0.0
14	29.99	29 68	29.867	51.0	0 A	22 0	11 P	36.5	34.6	31.3	1.3
15	30.14	29.99	30.096	24.5	2 P	13.0	12 P	18.7	18.3	15.3	4.9
16	30.25	30.05	30.176	16.5	3 P	8.0	8 A	12.3	12.7	11.3	7.1
17	30.38	29.96	30.152	15 0	1 P	−4.0	12 P	5.5	8.3	5.5	5.5
18	30.45	30.35	30.421	11.0	3 P	−9.0	7 A	1.0	−0.7	−3.5	4.6
19	30 42	30.24	30.350	14.0	6 P	−7.0	7 A	3 5	5.9	2 7	3.3
20	30.46	30.24	30.363	27.0	3 P	8.0	7 A	17.5	16 7	13.7	7.4
21	30 56	30 46	30.517	21.0	4 P	9.0	3 A	15.0	15.4	15.0	0.3
22	30.47	30.26	30 346	35.5	3 P	13.5	0 A	24.5	25.3	25.0	1.3
23	30.26	29.88	30 091	40.0	3 P	14.0	7:30 A	27.0	26.1	23.0	6.5
24	29 88	29.71	29.750	34.0	3 P	26.0	7 A	30.0	30.8	31.0	0.0
25	30.07	29 78	30.020	28.0	0 A	9.0	12 P	18 5	20.9	19.0	7.0
26	30.06	29.74	29 894	27.5	4 P	1.5	6 A	14.5	17.0	16 5	0.0
27	29 74	29.62	29.686	35.5	3 P	26.0	0 A	30 7	30.5	30.0	5.1
28	29.91	29.62	29 789	33.5	11 A	13.0	12 P	23.3	27.3	25 0	8.1
29	29 97	29.79	29 864	27.5	1 P	3.0	6 A	15.3	12 3	5.7	8.2
30	29.81	29.52	29.695	23.0	3 P	2.5	1 A	12.7	12.9	12.0	4.1
31	30.00	29.81	29.931	35.0	2 P	11.0	1 A	23.0	25.3	23.0	7.8

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movenent in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	25 0	.174	79.5	W.	353	4.0	28	1 A				
2	22.0	.163	73.5	W.S.W.	154	2.0	20	11 P				
3	7.0	.083	76.5	N.N.W.	164	1.0	14	1 A				
4	13.0	.108	82.0	W.	16	0.0	—	—				
5	16.0	.119	80.5	S.W.	123	2.5	22	12 M				
6	23 0	.138	94.0	N.W.	106	1.5	17	2 A	6 P	12 P	.16	1
7	28.5	.196	81.5	W.N.W.	20	1.0	14	10 P	0 A	4 A	.16	1
8	31.5	.195	90.0	W.N.W.	96	1.0	14	2 A	7 P	12 P	.18	
9	32.0	.196	95 0	N.W	57	0.0	—	—	0 A	10 P	.58	
10	24.5	.170	82.0	N.	338	12.5	50	11 A				
11	13.5	.103	80 5	W.	165	1.5	17	3 P	7 P	10 P		T
12	30.0	.168	92.5	S.W.	51	2.0	20	12 P	7 A	11 P	.05	
13	47.0	.353	93.0	S.S.W.	239	3.0	24	10 A	0 A	12 P	.04	
14	30 0	.186	92.0	W.N.W.	180	3.0	24	1 P	0 A	4 P	.13	T
15	11.0	.096	79 5	W.	245	6.0	35	8 P	3 P	5 P	.01	T
16	8.5	.078	76.0	W.	215	4.5	30	2 P				
17	3.5	058	90 5	N.W.	131	5.5	33	5 P	3 A	6 A	.01	¼
18	-6 0	.039	86.5	W.N.W.	3	0.0	—	—				
19	-1.0	.058	83.0	N.W.	18	0.0	—	—				
20	9.5	.089	77.5	N.W.	102	1.5	17	2 P				
21	14.0	.090	95.0	N.N.E.	21	0.0	—	—	1 P	3 P	.01	¼
22	23.5	.140	94.0	N.N.E.	19	0.0	—	—				
23	22.0	.130	95.0	N.N.E.	36	0.0	—	—				
24	30.0	.173	97.5	E.	90	3.0	24	12 P	6 P	11:30 P	.12	1½
25	16.5	.107	88.5	N.	477	13.0	51	10 A				
26	16.5	.102	97.0	W.	112	2.5	22	8 P	5:30 P	7 P	T	T
27	28.5	.171	94.5	S.S.W.	122	0.5	10	3 P				
28	24.0	.146	91.5	N.W.	175	1.5	17	12 M				
29	4 0	.059	88.5	N.	62	0.0	—	—				
30	9 5	.081	87.0	N.	52	0.0	—	—	6 A	1 P	.03	¾
31	20.5	.133	87.0	N.W.	80	2.0	20	8 A				

**Rain or melted snow at base of tower. * Included in following day.

Annual Summary for 1919.

Pressure. In inches.

Maximum reduced to freezing, ... 30.61, Mar. 15th, 8 A.
Minimum reduced to freezing, ... 28.89, Mar. 28th, 12 M.
Maximum reduced to freezing and sea-level, ... 30.92, Mar. 15th, 8 A.
Minimum reduced to freezing and sea-level, ... 29.20, Mar. 28th, 12 M.
Mean semi-daily reduced to freezing and sea-level, ... 30.034
Annual range, ... 1.72

***Air Temperature.** In degrees Fahr.

Highest, ... 101.0, June 3d, 4 P.
Lowest, ... —9.0, Dec. 18th, 7 A.
Mean hourly, ... 48.3
Mean of means of max. and min., ... 48.5
Mean sensible (wet bulb), ... 43.6
Annual range, ... 110.0
Highest mean daily, ... 85.4, July 5
Lowest mean daily, ... —0.7, Dec. 18
Mean maximum, ... 58.8
Mean minimum, ... 38.2
Mean daily range, ... 20.6
Greatest daily range, ... 43.5, June 13
Least daily range, ... 3.0, Dec. 9

Humidity.

Mean dew point, ... 39.8
Mean force of vapor, ...390
Mean relative humidity, ... 77.5

Wind.

Total movement, ... 52,335 m
Greatest daily movement, ... 580 m., Mar. 29
Least daily movement, ... 3 m., Dec. 18
Mean daily movement, ... 143 m
Mean hourly velocity, ... 6.0 m
Maximum pressure per square foot, 14.0 lbs., 53 m. per hour, Mar. 28, 10 P., N.W.
Maximum velocity for 5 minutes, 36 m. per hour, Jan. 11, 7 A. N.W.; Dec. 25, 9 A. N.
Prevailing direction, ... West.

Summary.

South Southwest . . . . . 13 per cent
South . . . . . 14 " "
Northwest . . . . . 11 " "
North . . . . . 11 " "
Other directions, ... 51 " "

Precipitation. In inches.

Total precipitation, rain or melted snow, . 41.42
Snow total in inches, ... 24.50
Number of days on which .01 or more rain or melted snow fell, ... 132

Weather.

Mean cloudiness observed, ... 48 per cent.
Total cloudiness recorded by Sun Thermometer, ... 1831 hrs.=42 per cent.
Number of clear days, ... 130
Number of fair days, ... 131
Number of cloudy days, ... 104

Bright Sunshine.

Number of hours recorded, 2569 hrs.=58 per cent.

Dates of Frosts.

Last, ... May 11th
First, ... Sept. 18th

Dates of Snow.

Last, ... April 25th
First, ... Nov. 5th
Total days of sleighing, ... 23

Gales of 50 or More Miles Per Hour.

Jan. 11th, 50m., N.W.; Mar. 28th, 53m., N.W.; Dec. 10th, 50m., N.W.; Dec. 25th, 51m., N.

Temperature in ground shelter.

G. A. SMITH,
Observer.

J. E. OSTRANDER,
Meteorologist.

BULLETIN No. 373. JANUARY, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.64, 31st, 9 A
Minimum reduced to freezing,	29.09, 17th, 1 P
Reduced maximum reading	30.99, 31st, 12 P
Reduced minimum reading,	29.41, 17th, 1 P
Mean semi-daily reduced	30.174
Monthly range	1.58

***Air Temperature.** In Degrees Fahr.

Highest	4.10, 27th, 4 P
Lowest	-16.5, 20th, 8 A
Mean hourly	16.0
Mean of means of max. and min.	15.2
Mean sensible (wet bulb)	13.6
Monthly range	57.5
Highest mean daily	35.9, 8th
Lowest mean daily	-4.7, 31st
Mean maximum	24.9
Mean minimum	5.5
Mean daily range	19.4
Greatest daily range	30.0, 20th, 27th
Least daily range	7.5, 8th

Humidity.

Mean dew point	11.4
Mean force of vapor	.095
Mean relative humidity	87.7

Precipitation. In inches.

Total precipitation, in inches	2.74
Total snow, in inches	23¼
Number of days on which .01 inch or more rain fell	13

Days of sleighing, 23.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	4734 m
Greatest daily movement	357m, 14th
Least daily movement	41m, 27th
Mean daily movement	153m
Mean hourly velocity	6.4 m

Maximum pressure per square foot, 9.5 lbs= 43m per hour, 18th, 12M, N.W.

Maximum velocity for 5 minutes, 30m per hour, 25th, 9A, N.

Prevailing direction, Northwest.

Summary.

North Northwest	26 per cent
North	16 " "
Northwest	13 " "
West Northwest	13 " "
South Southwest	10 " "
Other directions	22 " "

Weather.

Mean cloudiness observed	49 per cent
Total cloudiness recorded by the Sun Thermometer	80 hours = 27 per cent.
Number of clear days	12
Number of fair days	15
Number of cloudy days	4

Bright Sunshine.

Number hours recorded, 214 hrs,= 73 per cent

Rain, 1st. 8th, 9th, 23rd.

Snow, 8th, 9th, 13th, 14th, 16th, 17th, 19th, 20th, 23rd, 24th, 25th, 27th, 28th.

Hail, 7th.

Gales, 35m 12th, W.; 36m, 14th, W. N. W.; 35m, 17th, N.W.; 43m, 18th. N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29.81	29.45	29.603	37 0	4 P	23.0	12 P	30.0	29.3	26 5	1.7
2	29.88	29.72	29.863	18.0	3 P	9.0	8 A	13.5	13.5	8.5	7.8
3	30.12	29.88	30.052	18.5	3 P	8.0	12 P	13.3	10.8	9.0	8.0
4	30.35	30.12	30.263	18.0	4 P	−1.0	9 A	8.5	7.6	4.5	8.2
5	30.43	30.29	30.395	22.5	4 P	0 0	3 A	11.3	9.3	7.5	8.8
6	30.35	30.27	30.329	35.0	3:30 P	9.0	0 A	22.0	22.2	19.5	8.2
7	30.34	30.12	30.241	36.5	5 P	25.0	7 A	30.8	31.8	30.0	4.9
8	30 13	29.98	30.072	38.5	2 P	31.0	7 A	34.8	35.9	34.5	4.6
9	30.04	29.77	29 909	36.0	1 A	24 0	12 P	30 0	29.9	29.0	3.3
10	30.33	30.04	30.255	31.0	3 P	9.0	12 P	20.0	20.7	16 3	8.0
11	30.27	29 86	30.056	27.5	4 P	5 5	3 A	16.5	18.5	18.3	6.1
12	30.07	29.84	29 968	26.5	9 A	4.0	12 P	15.3	19.0	16.5	7.8
13	30.01	29.51	29.677	30.0	7 P	4.0	0 A	17.0	18.7	20.7	7.2
14	29.80	29.55	29.678	20.5	12 M	1.0	12 P	10.7	13.3	11.5	8.7
15	30.01	29 80	29.902	17.0	4 P	−3.5	12 P	6.7	5.1	2.7	8.8
16	30.17	29.93	30.099	12.0	4 P	−14.0	5 A	−1 0	−0.2	−2.0	8.0
17	29.93	29.41	29.563	24.5	3:30 P	7.0	0 A	15.7	14.6	12.8	6.7
18	30 08	29.55	29.823	14.0	9 A	2.0	12 P	8.0	8.8	9.3	7.3
19	30.21	30.02	30.133	12.0	2 P	−3 0	4:30 A	4.5	5.0	4.5	7.3
20	30.55	30.20	30.429	13.5	4 P	−16.5	8 A	−1.5	3.4	−2 8	7.0
21	30.54	29 96	30.231	29.5	12 M	10 0	12 P	19.8	17.9	13.8	6.3
22	30.68	30.54	30.634	25.0	2 P	−3 5	7 A	10.3	12.1	8.8	8.3
23	30.54	30.27	30.385	31.0	3 P	18.0	0 A	24.5	23.8	23.0	6.0
24	30.39	30.27	30 309	25.5	11 A	17.0	12 P	21.3	22.1	21.0	2.2
25	30 75	30.36	30.604	23 5	2 P	−1 5	12 P	11.0	13.5	8.3	7.5
26	30.89	30.47	30.757	15.5	3:30 P	−8.0	9 A	3.7	3.8	1.0	7.5
27	30 47	30.07	30 269	41.0	4 P	11.0	0 A	26.0	27 9	27.5	7.2
28	30 48	30.17	30 275	36.5	0 A	7.5	12 P	22.0	26 3	23.7	6.4
29	30.65	30.23	30.515	19.0	12 P	−2.0	8 A	8.5	11.5	7.5	7.2
30	30 41	29 96	30.115	37.0	2:30 P	10.5	12 P	23.7	25 4	21.7	7.0
31	30.99	30.41	30.903	1.0	4 P	−11.5	7 A	−5.3	−4.7	−10 5	9.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	25.0	.149	91.5	N.W.	126	4.0	28	10 P	9 A	11 A	.01	
2	4.5	.070	79.5	W.	240	4.5	30	5 A				
3	5.0	.068	85 0	W.N.W.	298	3.0	24	8 A				
4	0.0	.054	82.5	N.W	129	0.5	10	8 P				
5	3.5	.065	84.0	N.N.E.	208	2.5	22	8 A				
6	16.5	.113	89.5	N.	72	0.0	—	—				
7	37.5	.171	92.5	S.S.W.	133	1.5	17	6 P	9 P	11 P	T	
8	33.0	.196	95.5	S.	97	0.0	—	—	10 A	5 P	T	T
9	29.5	.160	100.0	N.	78	0.0	—	—	2 A	11 P	.85	6
10	14.0	.098	88.0	N.N.W.	113	0.5	10	2 P				
11	16.0	.107	88.5	S.S.W.	53	0.0	—	—				
12	13.5	.103	84.0	W.	236	6.0	35	8 A				
13	20.0	.119	97.5	S.S.W.	73	5.5	33	10 P	2 A	12 P	.17	$1\frac{3}{4}$
14	8.0	.080	81.5	W.N.W.	357	6.5	36	12 M	0 A	2 A	.02	T
15	−1.5	.053	79.5	N.N.W.	172	1.5	17	2 P				
16	−6.5	.047	79.0	N.W.	84	1.0	14	12 M	8 P	12 P	.20	2
17	12.0	.082	96.0	N.N.W.	188	6.0	35	5 P	0 A	6 P	.28	3
18	6.5	.073	84.5	W.N.W.	273	9.5	43	12 M				
19	2.5	.057	90.5	W.S.W.	167	0.5	10	2 P	3 P	8 P	.12	$1\frac{1}{2}$
20	−5.0	.023	88.5	N.N.W.	68	0.0	—	—	7 P	11 P	.08	$\frac{1}{2}$
21	11.0	.085	87.5	N.W.	120	3.0	24	12 M				
22	6.5	.072	87.0	N.	76	0.0	—	—				
23	22.0	.127	96.5	N.N.W.	64	0.0	—	—	0 A	12 P	.54	$2\frac{1}{2}$
24	20 0	.117	94 0	N.	175	1.5	17	10 A	0 A	12 P	.34	3
25	6.0	.072	86.5	N.N.W.	182	1.5	17	11 A				
26	−1.5	.051	86.0	N.N.W.	95	0.0	—	—	4 A	6 A	.02	T
27	25.5	.163	89.5	N.N.W.	41	0.0	—	—	5 A	10 A	.08	1
28	21.5	.141	89.5	N.N.E.	76	2.0	20	5 P				
29	4.0	.070	83.0	W.N.W.	102	0.5	10	6 A				
30	19 0	.126	83.5	W.S.W.	285	3.5	26	4 A				
31	−14.0	.029	78.5	N.	353	3.5	26	9 A				

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The most marked characteristics of the weather during the month were the low temperature and large amount of sunshine. To these was added a rather large snowfall with practically no thawing weather. The thermometer registered below zero on ten different days and the maximum temperature was above freezing on only eight days. Much of the snowfall occurred during the night and only four days were cloudy. Sleighing began on the ninth and continued for the rest of the month. The month closed with much snow on the ground and good sleighing on most of the roads.

The mean barometer was unusually high and the changes in pressure were unusually large. The maximum pressure was registered at midnight of the last day of the month and was the highest record ever made at this station. The range of pressure was practically the normal for January. The total wind movement was nearly normal and more than two-thirds was from the northwest quadrant.

The mean temperature was more than nine degrees below the normal, making it one of our coldest months. It was, however, 2.7 degrees warmer than the record of January, 1918. The maximum temperature was the same as for January, 1896, which was our lowest maximum record for any month. The minimum temperature was nearly ten degrees lower than the average value for this record.

The mean relative humidity was very high and the mean dew point was about six degrees lower than the normal.

The total precipitation was about three-fourths of the normal and practically all of it was snow.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

BULLETIN No. 374. FEBRUARY, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.71, 1st, 10 A
Minimum reduced to freezing,	28.89, 15th, 11 A
Reduced maximum reading	31.05, 1st, 10 A
Reduced minimum reading,	29.21, 15th, 11 A
Mean semi-daily reduced	29.983
Monthly range	1.84

***Air Temperature.** In Degrees Fahr.

Highest	45.0, 18th, 2.30 P
Lowest	-18.0, 1st, 7 A
Mean hourly	21.3
Mean of means of max. and min.	21.3
Mean sensible (wet bulb)	18.0
Monthly range	63.0
Highest mean daily	35.5, 18th
Lowest mean daily	-0.9, 1st
Mean maximum	30.9
Mean minimum	11.7
Mean daily range	19.2
Greatest daily range	35.5, 28th
Least daily range	3.5, 26th

Humidity.

Mean dew point	14.3
Mean force of vapor	.116
Mean relative humidity	82.9

Precipitation. In inches.

Total precipitation, in inches	4.45
Total snow, in inches	31.0
Number of days on which .01 inch or more rain fell	15

Days of sleighing, 29.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	4791 m
Greatest daily movement	450m, 16th
Least daily movement	5m, 10th
Mean daily movement	165m
Mean hourly velocity	5. 7m

Maximum pressure per square foot, 12.0 lbs= 49m per hour, 15th, 1P, W.N.W.

Maximum velocity for 5 minutes, 30m per hour, 27th, 4P, W.N.W.

Prevailing direction, West Northwest.

Summary.

North	17 per cent
Northwest	17 " "
West Northwest	14 " "
South Southwest	14 " "
West Southwest	10 " "
Other directions	28 " "

Weather.

Mean cloudiness observed	52 per cent
Total cloudiness recorded by the Sun Thermometer	82 hours = 28 per cent.
Number of clear days	11
Number of fair days	16
Number of cloudy days	2

Bright Sunshine.

Number hours recorded, 214 hrs, = 72 per cent.

Rain, 6th. 10th, 15th, .

Snow, 1st, 5th. 6th, 7th, 10th, 12th, 13th, 15th, 19th, 21st, 22d, 23d, 24th, 25th, 28th, 29th.

Hail, 6th.

Gales, 49m 15th, W.N.W.: 35m 27th, W. N. W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	31.05	30.73	30.938	14.0	4 P	−18.0	7 A	−2.0	−0.9	−3 5	7.8
2	30.73	30.44	30.537	38 0	3 P	9.0	0 A	23.5	24.3	21.3	7.0
3	30.66	30.43	30.496	37.0	2:30 P	24.0	8 A	30.5	30.0	26.3	6.2
4	30.77	30.65	30.740	27.5	3 P	17.0	8 A	22.3	22.6	18.7	5.7
5	30.67	29.89	30.369	29.0	12 P	19.0	7 A	24.0	23.0	21.5	1.3
6	29.89	29.32	29.484	34.0	1 P	26 0	11 P	30.0	31.1	30.7	5.8
7	29.69	29.29	29.479	37.0	3:30 P	26 0	12 P	31.5	29.9	27.0	8.6
8	30.01	29.69	29.899	34.5	3 P	21.5	6:30 A	28.0	25.2	22.3	9.3
9	30.16	30.01	30.151	34.0	3 P	8.0	12 P	21.0	19.1	20.3	9 0
10	30.14	29.76	29.889	18.5	6:30 P	1 0	6 A	9.7	10.9	10.7	1.5
11	29.99	29 81	29.945	34.5	1 P	3.0	5:30 A	18.7	16 3	10.3	9.3
12	30.09	29.98	30.058	28.0	3 P	3 5	5:30 A	15.7	19.2	18.3	7.5
13	30.04	29.65	29.836	34.0	6 P	21.5	3 A	27 7	27.5	27.0	4.4
14	30.09	29.81	29.959	43.0	3:30 P	20.0	7 A	31.5	30.5	26.7	9.1
15	29.81	29.21	29.345	36.0	7 A	10.0	12 P	23.0	23.2	22.0	4.6
16	29.88	29 57	29.744	16.5	1 P	4.0	12 P	10.3	9.5	7.5	8 7
17	29.89	29.73	29 822	30.0	12 P	0.0	2:30 A	15.0	18.1	19.0	7.0
18	29.79	29.73	29.779	45.0	2:30 P	28.0	2 A	36.5	35.5	33.3	8.5
19	29.78	29.39	29.536	36.0	0 A	14.0	12 P	25.0	26.4	23.5	6.2
20	30.34	29.78	30.138	27.5	4 P	8.0	5 A	17.7	18.5	16.7	10.1
21	30.57	30.32	30.489	33.5	11:30 A	9 0	7 A	21.3	21.3	16.3	9.1
22	30.37	30.10	30.152	3) 0	1:30 P	16.0	12 P	27.5	26.7	13.0	7.8
23	30.40	29.84	29 993	34.0	11 A	12 0	5 P	23.0	25.1	21.7	6.2
24	29.84	29.51	29.647	34.0	1:30 P	26.0	0 A	30.0	29.7	18.0	5.6
25	29.51	29.26	29.340	32.0	12 M	17.0	12 P	24.5	24 4	16.5	8.6
26	29.79	29.42	29.546	19.5	1:30 P	16.0	12 P	17.7	13.7	10.3	10.1
27	30.20	29.79	30.041	13.0	1 P	−4.0	5 A	4 5	5.0	4.0	10.2
28	30.33	30.02	30.210	23.5	1 P	−12.0	7 A	5.7	8.3	4 3	8.3
29	30.02	29.87	29 937	35.0	3 P	13.0	6 A	24.0	23.3	19.5	10.6

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	−16.5	.044	77.0	N.W.	107	0.5	10	0 A	8 P	10 P	.01	T
2	18.0	.147	79.0	S.S.W.	79	1.0	14	1:30 P				
3	23.0	.158	80.5	N.	150	1.5	17	9 P				
4	15.5	.109	82.0	N E.	288	3.0	24	2 P				
5	21.5	.118	100.0	N.N.E.	359	3.0	24	8 P	3 A	12 P	1.75	12
6	30.0	.172	97.5	N.	395	3.0	24	1 P	0 A	12 P	.62	3
7	23.5	.155	83.5	N.N.W.	183	5.0	32	12 M	0 A	2 A	.08	1
8	19.5	.128	84.0	N.W	24	2.0	20	0:30 P				
9	17.0	.119	83 0	N.W.	10	0.0	—	—				
10	10.0	.076	95.5	W.S.W.	5	0.0	—	—	5 A	5 P	.22	1½
11	5.5	.077	76.0	W.	8	0.5	10	3 P				
12	14.0	.111	79.5	W.N.W.	7	0.0	—	—	7 P	8 P	.02	T
13	25.5	.150	94.5	N.	20	1.5	17	6 P	9 A	8 P	.21	2
14	23.0	.163	79.5	S.S.W.	13	1.0	14	4:30 P				
15	20.0	.131	90.5	W.	271	12.0	49	1 P	5 A	4 P	.57	3
16	4.0	.067	81.0	W.N.W.	450	4.5	30	10 A				
17	16 0	.115	86 0	S.W.	263	3.0	24	6 P				
18	30.0	.206	79.5	S.S.W.	176	2.0	20	1 A				
19	21.5	.136	88.5	N.N.W.	225	3.5	26	12 M	5 A	3 P	.22	2½
20	12.0	.103	75.0	N.W.	214	2.0	20	12 M				
21	12.0	.100	78.5	W.S.W.	102	0.5	10	8 P	8 P	12 P	.26	2
22	8.5	.140	75.5	N.	140	1.0	14	1:30 P	0 A	3 A	.18	1½
23	18.0	.126	82 5	E.S.E.	83	0.0	—	—	5 P	12 P	.12	1
24	17.5	.104	94.0	N.	86	0.0	—	—	0 A	12 P	.13	1
25	12.0	.100	77.5	N.W.	287	2.0	20	1 P	0 A	3 A	.02	T
26	6 0	.076	77.5	W.N.W.	353	3.5	26	7 P				
27	−1.0	.058	76.0	W.N.W	306	6.0	35	5 P				
28	−1.5	.065	76.0	S.S.W.	119	1.5	17	12 M	6 P	12 P	.04	½
29	15.0	.115	75.5	W.S.W.	68	0.5	10	8 P	0 A	3 A	T	T

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during February was exceptional in many ways. The barometer, which had reached the unprecedented height of 30.99 inches at midnight on the last day of the previous month, continued to rise until 10 A. M. on the first, when 31.05 inches was recorded, making a new high record for pressure at this station. The changes in pressure during the month were generally large and some were rather rapid. The total range of pressure for the month nearly equalled the normal range for an entire year. The marked barometric activity was not appreciably reflected in the total wind movement of the month.

The snowfall was by far the most noticeable feature of the month. The large amount of snow which had accumulated during January, owing to the absence of any appreciable thaw during that month, was augmented by a very large snowfall during February. A single storm early in the month was one of the most severe in recent years. This was followed by several storms of moderate amounts throughout the month, so that the total exceeded two and one-half feet. With practically no thawing weather during the month the accumulated snowfall of two months was practically all on the ground when the month closed. Although more or less settlement had taken place the ground was covered with from two and one-half to three and one-half feet.

Another feature of interest was the temperature. While the mean for the month was only about three degrees lower than the normal, the temperature was above freezing but little of the time. The temperature dropped to eighteen degrees below zero on the first and the mean hourly for that day was below zero. Near the end of the month very low temperatures were again noted. With the advent of warmer weather during the coming month swollen rivers and streams and damage from high water seems inevitable.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

BULLETIN No. 375. MARCH, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.24, 4th, 9 A
Minimum reduced to freezing,	28.72, 13th, 5 P
Reduced maximum reading	30.55, 4th, 9 A
Reduced minimum reading,	29.03, 13th, 5 P
Mean semi-daily reduced	29.972
Monthly range	1.52

***Air Temperature.** In Degrees Fahr.

Highest	70.5, 25th, 3.30 P
Lowest	-1.0, 2d, 7:30 A
Mean hourly	34 0
Mean of means of max. and min.	34 3
Mean sensible (wet bulb)	30.8
Monthly range	71.5
Highest mean daily	47.1. 28th
Lowest mean daily	14.5, 2d
Mean maximum	45.4
Mean minimum	23 2
Mean daily range	22.2
Greatest daily range	43.5, 25th
Least daily range	4.0, 5th

Humidity.

Mean dew point	26.6
Mean force of vapor	.202
Mean relative humidity	78.2

Precipitation. In inches.

Total precipitation, in inches	2.90
Total snow, in inches	5.75
Number of days on which .01 inch or more rain fell	11

Days of sleighing, 22.

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	6263 m
Greatest daily movement	537m, 6th
Least daily movement	54m, 11th
Mean daily movement	202m
Mean hourly velocity	8.4m

Maximum pressure per square foot, 16.0 lbs= 57m per hour, 6th, 10:30 A, N.W.

Maximum velocity for 5 minutes, 36m per hour, 6th, 11A, N.W.

Prevailing direction, West.

Summary.

West	19 per cent
West Northwest	16 " "
South Southwest	16 " "
West Southwest	13 " "
Northwest	13 " "
Other directions	23 " "

Weather.

Mean cloudiness observed	41 per cent
Total cloudiness recorded by the Sun Thermometer	129 hours = 35 per cent.
Number of clear days	16
Number of fair days	10
Number of cloudy days	5

Bright Sunshine.

Number hours recorded, 242 hrs, = 65 per cent.

Rain. 5th, 11th, 12th, 13th, 17th, 26th, 27th, 29th, 30th, 31st.

Snow. 19th, 20th.

Gales. 57m 6th, N.W.; 36m, 7th, W.; 40m, 14th, W. N. W.; 36m, 17th, W.N. W.; 35m, 18th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper	Mean Sensible Wet Bulb.	
1	29.97	29.63	29.775	37.0	2:30 P	6.0	7:30 A	21.5	21.2	14.0	10.4
2	30 38	29 97	30.302	29.0	4 P	−1.0	7:30 A	14.0	14.5	8.5	10.5
3	30.51	30.38	30.497	44 0	3 P	8 0	7:30 A	26 0	26.3	20 3	6.7
4	30 55	30.21	30 429	46.0	2:30 P	24.5	6 A	35.7	35.3	33.3	7.5
5	30.21	29.40	29 726	44.0	4 P	40.0	0 A	42.0	42.0	41.5	6.0
6	29 77	29.17	29 433	42 0	0 A	11 0	12 P	26.5	20 1	16.3	7.6
7	30.21	29.77	30 070	24.5	5:30 P	6.0	8 A	15 3	14.6	11.0	11 0
8	30 34	30 20	30.281	28 0	3 P	4 5	6 A	16.3	16.4	12.3	10 0
9	30 28	30.21	30 245	38.0	10:30 A	14 5	4 A	26.3	27.2	26.7	10.1
10	30.28	30.13	30.189	46.5	3 P	30.0	1 A	38.3	37.2	33.5	9.5
11	30.31	30.12	30 204	42 0	7 P	24.0	5:30 A	33.0	34.5	33.5	4.3
12	30 12	29 53	29.686	45.0	7 P	35 0	4 A	40.0	40.9	41.3	0.0
13	29.58	29 03	29 274	43.0	0 A	21 0	12 P	32.0	35 4	27.7	0.0
14	30.01	29 30	29.741	24 5	6 P	17.0	7 A	20 7	20.7	18.7	7.0
15	30.26	30.01	30.188	42.0	3 P	15.0	6:30 A	28 5	29.8	28.3	10.0
16	30.15	29.65	29.897	44.0	2:30 P	31 0	0 A	37.5	37 9	38.3	5.0
17	30.01	29.63	29.862	42 0	2:30 P	30.0	12 P	36 0	37 6	33.5	7.2
18	30.17	30 01	30.120	38.0	0:30 P	19.0	12 P	28 5	29 5	27.0	11.5
19	30.17	29 66	29 912	34.5	3 P	15.5	2-30 A	25 0	26.6	24 3	7 3
20	29.80	29.38	29.444	34.0	3 P	26 0	3 A	30 0	29.4	30.7	0.3
21	30.26	29.80	30.046	48.0	2:30 P	22.0	7:30 A	35.0	35.3	32.3	12.0
22	30.48	30 26	30.289	51.0	4 P	26 0	3:30 A	38.5	39.3	35.0	12.0
23	30.36	30.22	30.316	65.0	5 P	31.0	6:30 A	48.0	46.5	38.5	11.5
24	30.36	30.18	30.289	68.0	4:30 P	28.0	6:30 A	48.0	45.8	38 7	10.8
25	30 18	29.95	30.068	70.5	3:30 P	27.0	6 A	48.7	46.6	40 5	11.3
26	29 95	29.61	29 794	57.0	4 P	36.0	6:30 A	46 5	45 4	43.5	7.1
27	29.81	29.57	29.588	51.0	4 P	39.0	5:30 A	45 0	44 8	43 5	4 2
28	29 98	29.81	29.928	66.0	3:30 P	35 0	12 P	50.5	47.1	39.0	11.2
29	29.96	29.59	29 747	49.0	8:30 P	29.0	4 A	39 0	37.9	37.5	0.3
30	29.86	29.71	29.817	52 0	5 P	35.5	7 A	43.7	43.5	37.5	9.7
31	29 98	29.76	29.965	60.5	3 P	34 0	6 A	47.2	45.9	37.7	9.8

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidit	Prevailing Direction.	Total Movenent in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	9.5	.092	75.5	N.W.	214	1.5	17	12 M				
2	9.5	.081	71.5	W.	93	0.5	10	3 A				
3	17.0	.133	80.0	S.S.W.	121	1.0	14	2 P				
4	31 0	.202	89 0	S.S.E.	112	0 5	10	4 P				
5	41.0	.270	96.0	S S.E	247	2.0	20	1 P	11 A	12 P	.90	
6	13 0	.096	85.0	W.N.W.	537	16.0	57	10½ A				
7	5.5	.083	74 0	W.S.W.	419	6.5	36	9 A				
8	7 5	.087	75.0	W.S.W.	225	2 0	20	3 P				
9	21 0	.163	70.5	W.	227	2.5	22	1:30 P				
10	30.0	.209	78.0	S. W.	161	1.5	17	4 P				
11	31 0	.204	87 0	S.S.W.	34	0.0	—	—	11 A	5 P	.03	
12	40.5	.265	94 0	S.S.W.	143	3.0	24	11½ P	3 A	12 P	08	
13	32 0	.189	97 5	N.	231	5.5	33	10 P	0 A	10 P	.80	
14	15.5	.110	82 0	N.W.	466	8 0	40	5 A				
15	21.5	.168	71.0	W.S.W.	132	3 0	24	2 A				
16	36.5	.242	89.5	S.S.W.	214	3.5	26	3 P				
17	28.0	.216	69.5	W.N.W.	377	6.5	36	9 A	0 A	2 A	.01	
18	21.5	.160	73.5	W.N.W.	402	6.0	35	6 A				
19	22.5	.136	90.5	W S.W.	68	1 0	14	6 P	5 P	12 P	.25	2
20	30 0	.171	97.5	N.N.W.	182	2.0	20	2 P	0 A	6 P	.44	3¾
21	26 5	.207	70.5	W.	163	3 0	24	3 A				
22	25.5	.251	56.0	W.	136	1.0	14	1 P				
23	32 0	.275	64 5	S.S.W.	140	0.5	10	3 P				
24	32.5	.275	68.5	S.	80	0.0	—	—				
25	34.0	.318	63.5	N W.	78	0 0	—	—				
26	41.5	.298	89 0	W.	80	1.5	17	6 P	6 P	12 P	.22	
27	43.0	.289	96 5	W.	131	2 5	22	4 P	0 A	10 A	.03	
28	29.0	.309	51.5	N.W.	238	2.5	22	5 A				
29	36.0	.231	91 0	S.W.	48	4.5	30	10 P	9:30 A	10 P	.13	
30	30 0	.272	62.5	W.N.W	364	5.5	33	1 P	8:30 P	10 P	.01	
31	30.5	.275	63.5	W.N.W.	200	1.5	17	2 A	11 P		T	

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during March was generally seasonable and presented few features of interest. The transition from Winter to Spring was nearly complete when the month closed. The large amount of snow on the ground at the close of February showed but little shrinkage during the first half of the month but by the last of the month the snow, except where drifted, had entirely disappeared without causing extremely high water in the smaller streams of this locality. When the snow had disappeared it was found that there was but little frost in the ground and the fields dried rapidly. The last third of the month had a number of unusually warm days for the time of year.

The mean barometer was slightly lower than the normal and the range of pressure was rather large. Large fluctuations in pressure were recorded and the total wind movement was about ten per cent more than usual. The wind was nearly all from the Western points of the compass.

The mean temperature was practically normal and the range unusually large. This last feature was due to a maximum temperature nearly eight degrees higher than usual and a mimimum, nearly six degrees lower than usual. On the 25th the range for the day was nearly as large as a monthly range in mid-summer. The mean dew point was practically normal and the relative humidity slightly higher than usual.

The total precipation was about three-fourths of the normal and was well distributed throughout the month. At the equinoctial period the only snowstorm of the month occurred. This was nearly six inches but it melted in a few days. The amount of clear sunshiny weather was more than usual.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

BULLETIN No. 376. APRIL, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing, 29.84, 1st, 8 A; 26th, 8 A.
Minimum reduced to freezing, 28.89, 5th, 5 P
Reduced maximum reading . 30.14, 1st, 8 A 26th, 8 A.
Reduced minimum reading, 29.20, 5th, 5 P
Mean semi-daily reduced 29.823
Monthly range 0.94

***Air Temperature.** In Degrees Fahr.

Highest . . . . . 74.5, 20th, 3 P
Lowest . . . . . 22.0, 9th, 5 A; 10th, 6 A
Mean hourly 43.2
Mean of means of max. and min. 43.2
Mean sensible (wet bulb) 38.6
Monthly range 52.5
Highest mean daily 53.6, 20th
Lowest mean daily 29.4, 8th
Mean maximum 52.5
Mean minimum 33.9
Mean daily range 18.6
Greatest daily range 42.0, 20th
Least daily range 3.5, 2d

Humidity.

Mean dew point 33.2
Mean force of vapor 277
Mean relative humidity 72.5

Precipitation. In inches.

Total precipitation, in inches 4.71
Total snow, in inches 1.5
Number of days on which .01 inch or more rain fell 12
Days of sleighing, None.

*Temperature in ground shelter.
**Reduced to freezing and sea-level.

Wind.

Total movement . . . . . 6158 m
Greatest daily movement 507m, 6th
Least daily movement 63m, 22d
Mean daily movement 205m
Mean hourly velocity 8.5m
Maximum pressure per square foot, 8.5 lbs= 41m per hour, 6th, 1 P, W.N.W.
Maximum velocity for 5 minutes, 35m per hour, 6th, 1 P, W.N.W.
Prevailing direction, West Northwest.

Summary.

West . . . . . 13 per cent
West Northwest . . . . . 20 " "
South Southwest . . . . . 10 " "
North . . . . . 13 " "
Northwest . . . . . 13 " "
Other directions . . . . . 31 "

Weather.

Mean cloudiness observed . . . . 51 per cent
Total cloudiness recorded by the Sun Thermometer . . 184 hours = 46 per cent.
Number of clear days 13
Number of fair days 5
Number of cloudy days 12

Bright Sunshine.

Number hours recorded, 218 hrs, = 54 per cent.
Rain. 4th. 5th, 6th, 7th, 8th, 12th, 13th, 15th, 21st, 23d, 24th, 27th, 28th, 29th.
Snow. 4th, 6th, 7th, 8th.
Thunder and Lightning. 23d.
Frost. after the 15th: 18th, 20th, 26th.
Gales. 41m, 6th, W.N.W.; 37m, 13th, S.S.W.; 37m, 24th, N. W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean, Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.14	30.01	30.109	60.5	3 P	34.0	4 A	47.3	44 6	38.7	9.8
2	30.08	29 61	29.803	37.5	6 P	34.0	2 A	35.7	35.7	35.7	0.0
3	29.99	29.86	29.933	59.0	4 P	31 5	6 A	45.2	45.8	39.5	11.9
4	30.01	29.77	29.899	44.0	0 A	35 0	1:30 P	39.5	37.4	35.5	0.0
5	29 79	29 20	29.399	40.5	6 P	33.0	12 P	36 7	37.7	36.5	0.0
6	29.81	29.32	29.656	38.5	1 P	27.0	7:30 A	32 7	32.4	28.5	10.0
7	29.79	29 51	29.580	41.0	4:30 P	27.0	6:30 A	34.0	33.3	29 3	6.5
8	29.84	29.65	29.725	35.0	4 P	24.5	6:30 A	29 7	29 4	25.7	11.6
9	29.96	29.84	29.875	38.0	3:30 P	22.0	5 A	30.0	30.7	27.3	11.0
10	30.02	29.84	29 911	53.5	5 P	22 0	6 A	37.7	37.7	34.0	12.5
11	30.01	29.90	29.963	52.5	2 P	26.0	6 A	39.3	40.1	36.5	10.8
12	30.01	29.67	29 874	51.5	1 P	26.5	5 A	39.0	41.2	37 5	4.7
13	29.67	29 37	29.480	55.0	11 A	35.0	12 P	45.0	46 0	41.5	0 0
14	29 86	29.57	29 724	50.5	3:30 P	31.5	6 A	41.0	40.6	34.5	11.9
15	29.90	29.75	29.834	58.0	2 P	30.0	6 A	44.0	45.0	41.7	11.5
16	29.80	29.63	29 673	54.0	4 P	43 5	5 A	48.7	47.3	42.5	2.3
17	30.02	29 75	29.924	57.0	5 P	42.5	12 P	49.7	46.5	41 5	8.5
18	30.10	30 02	30.088	58.0	11:30 A	31.0	6 A	44 5	46 1	41 0	10.7
19	30 08	29 90	29.990	68.0	5 P	34 0	5 A	51 0	52.3	45 3	12.8
20	30.07	29.92	29.999	74.5	3 P	32.5	6 A	53.5	53.6	44.0	12.0
21	29.95	29.53	29.684	51.0	0 A	43.5	6 A	47.3	45 4	44.0	0.0
22	29.96	29.62	29.862	58.0	5 P	42.5	6 A	50.3	47.7	44.0	3.7
23	29.93	29.55	29 635	53.0	6 P	44.5	6 A	48.7	48.3	47.3	0.0
24	29.88	29.54	29.701	51.0	2 P	40.0	12 P	45 5	45.3	39 0	10.1
25	30.09	29.88	30.035	56.5	5 P	36.5	6 A	46.5	46.0	39.7	12.5
26	30.14	29.89	30.021	63.5	2:30 P	31.5	6 A	47.5	49 4	41.7	11.3
27	30.03	29.87	29.943	52.5	3 P	38 0	12 P	45 3	48 9	40.0	2.5
28	29.87	29.54	29.657	49.0	5:30 P	40.0	0 A	44 5	44 9	39.0	3.5
29	29.92	29.71	29.819	55.5	3:30 P	38.0	4 A	46.7	46.5	43 7	5.0
30	29.99	29.87	29.902	60 0	3 P	40.0	4:30 A	50.0	49.2	43.3	11.3

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	32 0	.283	64.5	S.S.E.	133	1.5	17	6 P				
2	35.5	.208	98.0	N.	143	1.5	17	12 P				
3	29.5	.317	54.5	W.	150	5.0	32	2 P				
4	32.0	.219	82 5	W.N.W.	127	0.0	—	—	11 A	12 P	.42	T
5	35 0	.224	91.5	N.N.W.	140	1.5	17	8 P	0 A	7 P	.52	
6	24.5	.167	79.5	W.N.W.	507	8.5	41	1 P	8 A	9 A	T	T
7	25 0	.174	84.0	W.N.W.	217	4.0	28	4 P	2 A	10 A	.16	1½
8	19.5	.156	70 0	W.N.W.	387	5.0	32	12 M	11 A	1 P	T	T
9	19.0	.172	61.5	W.N.W.	197	1.5	17	3:30 P				
10	25.5	.236	58 0	N.	139	1.0	14	11 P				
11	31.5	.244	72.0	N.N.E.	121	1.0	14	8 A				
12	33.5	.263	76.5	S.S.W.	111	2.5	22	2 P	6 P	12 P	.44	
13	37.5	.287	79 0	W.	346	7.0	37	1 P	0 A	6 P	.86	
14	25.5	.250	55 5	N.W.	246	2.5	22	10 A				
15	36.5	.309	72 5	W.S.W.	313	3.0	24	9 P	7 P	11 P	.02	
16	39.0	.304	78.5	W.	244	3.0	24	8 A				
17	35.0	.293	69.5	E.S.E.	119	1 0	14	2 P				
18	32.5	.323	57.0	N.	168	3.5	26	1 P				
19	35.0	.414	49.0	N.N.W.	303	5.5	33	10 A				
20	33.5	.404	49.0	W.S.W.	117	1.0	14	10 A				
21	43.0	.300	92 0	N.N.E.	140	0 0	—	—	1 A	12 P	.45	
22	42.0	.312	85.5	S.S.W.	63	0 0	—	—				
23	45.5	.350	88.0	S.S.W.	131	2.0	20	9 A	1 A	12 P	.44	
24	31.5	.286	63.0	N.W.	360	7.0	37	2 P	0 A	3 A	.08	
25	30.0	.302	55.5	N W.	302	4.5	30	1 P				
26	33.5	.348	66.5	N.W.	138	1.5	17	11 A				
27	37.5	.265	85.0	E S.E.	132	1.0	14	2 P	6 P	12 P	.28	
28	37.0	.248	89.5	N.	172	2.5	22	0:30 P	0 A	2 P	1.03	
29	41.0	.321	80.5	W.	247	5.5	33	6 P	6 P	7 P	.01	
30	37.5	.332	67.5	W.N.W	245	2.0	20	1 P				

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during April was considerably colder than the normal for this month, and the precipitation was greater than usual. A large wind movement was recorded, although only a few gales were registered. The seasonal progress was slow, and but little work was done toward spring planting. But few frosts were noted after the middle of the month.

A comparison of the records of the severel weather elements with their respective normals shows the following features of interest: The mean barometer was unusually low and the range rather small. The mean daily barometer was above 30 inches on only four days. Although the fluctuations in pressure were not large the total wind movement was nearly one-sixth more than usual. Most of the wind was from the northwest quadrant.

The mean hourly temperature was more than three degrees below the normal, although the minimum for the month was practically normal. The maximum temperature was about five degrees lower than usual. The range of temperature on the 20th was unusually large.

The mean dew point and relative humidity were both considerably more than the normal.

The total precipitation was more than fifty per cent above the normal and was well distributed throughout the month. One snow storm and one thunder storm were noted.

The percentage of sunshine was nearly the normal amount.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

Correction to March Bulletin, No. 375.

Precipitation on the 6th should read 0 A to 1 P., .73 in rain column and 4 inches of snow in snow column, and the total precipitation should read 3.63 inches. Total snow $9\frac{3}{4}$ inches.

BULLETIN No. 377. MAY, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.15, 17th, 8 A
Minimum reduced to freezing,	29.42, 1st, 5 A
Reduced maximum reading	30.45, 17th, 8 A
Reduced minimum reading,	29.72, 1st, 5 A
Mean semi-daily reduced	30.056
Monthly range	0 73

***Air Temperature.** In Degrees Fahr.

Highest	83 5, 28th, 3 P
Lowest	30.5, 5th, 5.30 A
Mean hourly	54.6
Mean of means of max. and min.	54.5
Mean sensible (wet bulb)	49.2
Monthly range	53.0
Highest mean daily	67.6, 28th
Lowest mean daily	41.0, 4th
Mean maximum	66.5
Mean minimum	42.6
Mean daily range	23.9
Greatest daily range	39.0, 17th
Least daily range	5.5, 21st

Humidity.

Mean dew point	44.3
Mean force of vapor	.431
Mean relative humidity	71.1

Precipitation. In inches.

Total precipitation, in inches	3.65
Number of days on which .01 inch or more rain fell	10

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3703 m
Greatest daily movement	207m, 10th
Least daily movement	42m, 24th
Mean daily movement	120m
Mean hourly velocity	5.0m
Maximum pressure per square foot, 5.0 lbs = 32m per hour, 10th, 12 P, N.N.W.	
Maximum velocity for 5 minutes, 30m per hour, 10th, 11 P, N.N.W.	
Prevailing direction, West.	

Summary.

West	16 per cent
West Northwest	13 " "
South Southwest	13 " "
North Northwest	10 " "
Northwest	10 " "
West Southwest	10 " "
Southwest	10 " "
Other directions	18 "

Weather.

Mean cloudiness observed	39 per cent
Total cloudiness recorded by the Sun Thermometer . . 172 hours = 38 per cent.	
Number of clear days	14
Number of fair days	13
Number of cloudy days	4

Bright Sunshine.

Number hours recorded, 281 hrs, = 62 per cent.

Rain, 1st, 2d, 3d, 4th, 5th, 7th, 8th, 9th, 10th, 11th, 13th, 14th, 20th, 21st, 22d.

Thunder and Lightning, 14th, 20th.

Hail, 2d, 4th.

Gales, none.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29 82	29 72	29.768	55.5	3 P	41.0	12 P	48.3	48.3	39.7	5.9
2	29.90	29 77	29.821	53.0	1:30 P	34.5	6 A	43.7	49.0	42.0	9.3
3	30.00	29.90	29.976	54.0	3 P	39 0	7 A	46.5	46.5	43 0	8.7
4	30.21	29 93	30.043	59.0	4:30 P	35.0	12 P	47.0	41.0	37.3	6.3
5	30.35	30.21	30.296	63.0	5 P	30 5	5:30 A	46 7	47.3	43.0	13.5
6	30.34	30.17	30.258	69.0	4:30 P	33.0	6 A	51.0	51 5	45.0	13.0
7	30.22	30.08	30.143	66.0	0:30 P	37.5	6 A	51.7	52.2	44 3	8.5
8	30.13	29.89	29.999	51.5	6 P	44 0	6 A	47.7	48.7	48.3	0.0
9	29 89	29.77	29.822	67.5	3 P	42.0	7 A	54.7	54.0	48.5	11.0
10	30.01	29.78	29.892	65.0	9:30 A	39.5	6 A	52.3	54.7	48.0	6 0
11	30 05	29.92	29.983	51.5	3 P	39.0	5 A	45.3	44 7	43.0	0.0
12	30.00	29.92	29.963	66.5	4 P	34 0	5:30 A	50.3	51.9	46.0	12.3
13	29.94	29.84	29.899	62.0	3:30 P	44.0	7 A	53.0	52 0	46 3	5 5
14	30.10	29.94	30.034	54 5	1:30 P	42.0	12 P	48.3	47.5	44.3	5.3
15	30.34	30 10	30.219	61.5	5:30 P	41.0	5 A	51 3	50.2	46.5	11.0
16	30.43	30.34	30.396	71 0	6 P	35.0	6 A	53.0	54.3	47 0	13 4
17	30 45	30.25	30.349	77.0	4:30 P	38.0	6 A	57.5	59.2	50.5	13 2
18	30.27	30 09	30.281	74.0	4 P	44.5	6 A	59.3	59 0	50.0	13 2
19	30.14	29.93	30.020	78.5	4 P	43 0	5:30 A	60.7	62.0	55.3	12.8
20	29.99	29.96	29.983	74.5	2 P	53 5	5:30 A	64.0	62 7	59.0	8.7
21	29.98	29.93	29.957	60.5	4 P	55 0	12 P	57.7	57 9	56.0	0.3
22	30.20	29.93	30.066	57.0	8 A	45.0	12 P	51.0	50.8	49.7	0.6
23	30.30	30.20	30.260	60.0	4 P	42.5	7 A	51 3	50 2	45 7	7.9
24	30.23	30.11	30.163	65.5	5 P	48.0	6 A	56 3	55.0	50.5	7.0
25	30.12	30.04	30.094	70.0	4 P	47 0	6 A	58.5	58.3	54.0	7.6
26	30.08	30.00	30.051	76.5	5 P	53 0	5 A	64.7	64.5	58.5	12.4
27	30.05	29.89	29.970	82.0	3:30 P	46.0	6 A	64 0	64.5	57.7	13.3
28	29.97	29.77	29 842	83 5	3 P	51.0	5:30 A	67.3	67.6	56.5	13.5
29	30.03	29.83	29.936	77.0	5 P	48.0	5 A	62.5	63 4	55.7	13 9
30	30.12	30.03	30.121	78.0	4 P	48 0	5:30 A	63.0	62 5	57.0	13.5
31	30.21	30.07	30 143	77.0	2 P	46.0	5 A	61.5	60.0	58 3	12.9

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	31 5	.309	59.0	N.W.	167	3.0	24	5 P	3:30 P	4:30 P	T	
2	37.5	.304	75.0	N.W.	170	2.0	20	3 P	9 A	4 P	.03	
3	39 0	.312	75 5	W.	97	0.0	—	—	3 P	6 P	T	
4	33.5	.248	80.0	N.N.W.	154	3.5	26	5:30 P	3 A	6 P	.30	
5	35.5	.350	60.0	N.N.W.	107	1.5	17	10 P				
6	38 5	.369	64.5	W.	115	1.5	17	9:30 P				
7	37.0	.372	60.5	S.W.	130	3.5	26	7 P	3 P	4 P	T	
8	46.5	.357	89 0	W.	73	0.0	—	—	10 A	12 P	.90	
9	44.5	.400	76.0	N.W.	131	3.0	24	6 P	0 A	4 A	.08	
10	42.0	.427	62.0	W.N.W.	207	5.0	32	12 P	3 P	5 P	T	
11	41.0	.299	85.5	W.S.W.	85	1.0	14	2 P	7 A	4 P	.07	
12	38.0	.403	57.5	W.N.W.	79	1 0	14	2 P				
13	42.5	.367	72 0	W.S.W.	79	0 5	10	4 P	4 A	12 P	.05	
14	42 0	.317	84 5	W.S.W.	103	0.5	10	4 P	0 A	9 P	.79	
15	41.0	.364	71.0	N.N.W.	178	2.0	20	11 A				
16	37.5	.452	49 5	W.N.W.	71	0.5	10	10 A				
17	42.5	.502	54.5	S.S.W.	69	1.0	14	6 P				
18	40.5	.506	49.5	S.S.W.	153	1.5	17	10 P				
19	50.0	.545	66.0	S.W.	99	1 0	14	8 P				
20	57.5	.538	89.5	S.W.	105	1.5	17	4 P	4 P	12 P	.16	
21	55.0	.430	91.5	S S.W.	79	0.5	10	6 P	0 A	12 P	1.14	
22	49.0	.382	91.5	N.E.	182	2.5	22	6 P	0 A	9 P	.13	
23	43 5	.340	81.5	E.	161	0 0	—	—				
24	47.0	.425	76.0	E.S.E.	42	0.0	—	—				
25	46.5	.490	64.5	E N.E.	98	1 0	14	6 P				
26	53.5	.625	65.5	E.	143	0.5	10	10 A				
27	53.0	.611	67.0	W.	49	2.0	20	10 P				
28	48.5	.644	53.5	W.	129	0.0	—	—				
29	50.0	.578	61.0	N.	142	1.0	14	6 P				
30	53.5	.582	86 0	W.N.W	104	2.0	20	6 P				
31	56.5	.517	85.5	S S.W.	202	3.0	24	2 P				

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The backwardness of the season, which was so pronounced at the close of April, continued throughout this month. In most respects the season's advance was fully three week's behind the normal. Temperatures ruled low during the first half of the month, and considerable wet weather helped to retard the season's progress. The last third of the month was free from rain, and somewhat higher temperatures were recorded. On the whole the weather was very unfavorable for growing crops. The soil moisture was excessive on all but the lightest soil.

An examination of the records of the several weather elements shows the following features of interest: The mean barometer was considerably higher than the normal and the range of pressure was less than usual. The total wind movement was about 80 per cent of the normal, and no gales were noted. The wind direction was more variable than usual.

The mean temperature was three degrees below the normal and the range less than usual. The maximum temperature was more than three degrees below the normal and the minimum was practically normal. On only two days near the last of the month was a temperature above 80 degrees recorded. A few light frosts were noted early in the month.

The mean dew point was more than three degrees lower than usual, and the relative humidity slightly higher than the normal.

The total precipitation was nearly normal, and most of it occurred during two heavy storms; the first on the 8th—9th, and the second on the 20th—22d. This second storm proved to be the last one of the month and was followed by some fairly seasonable weather.

The amount of sunshine was considerably more than normal.

J. E. OSTRANDER, Meteorologist.

G. S. SMITH, Observer.

BULLETIN No. 378. JUNE, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.04, 27th, 9 A
Minimum reduced to freezing,	29.29, 16th, 2 P
Reduced maximum reading	30.32, 27th, 9 A
Reduced minimum reading,	29.54, 16th, 2 P
Mean semi-daily reduced	29.952
Monthly range	0.78

***Air Temperature.** In Degrees Fahr.

Highest	88.0, 11th, 2 P; 27th, 4 P
Lowest	45.0, 20th, 6 A
Mean hourly	64.5
Mean of means of max. and min.	64.7
Mean sensible (wet bulb)	59.4
Monthly range	43.0
Highest mean daily	73.6, 2d
Lowest mean daily	50.3, 18th
Mean maximum	75.3
Mean minimum	54.1
Mean daily range	21.2
Greatest daily range	35.5, 10th
Least daily range	6.0, 18th

Humidity.

Mean dew point	56.9
Mean force of vapor	.618
Mean relative humidity	77.5

Precipitation. In inches.

Total precipitation, in inches	6.26
Number of days on which .01 inch or more rain fell	12

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3055 m
Greatest daily movement	201m, 7th
Least daily movement	30m, 24th
Mean daily movement	102m
Mean hourly velocity	4.2m

Maximum pressure per square foot, 3.5 lbs = 26m per hour, 29th, 3 P, S.

Maximum velocity for 5 minutes, 24m per hour, 29th, 2P, S.

Prevailing direction, North.

Summary.

North Northeast	23 per cent
North Northwest	10 " "
South	23 " "
South Southwest	10 " "
Other directions	34 "

Weather.

Mean cloudiness observed	51 per cent
Total cloudiness recorded by the Sun Thermometer	216 hours = 47 per cent.
Number of clear days	9
Number of fair days	13
Number of cloudy days	8

Bright Sunshine.

Number hours recorded, 241 hrs, 53 = per cent.

Rain, 3d, 5th, 6th, 13th, 15th, 16th, 17th, 18th, 21st, 22d, 28th, 29th, 30th.

Thunder and Lightning, 15th, 29th, 30th.

Hail, 29th.

Gales, none.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.09	29.97	30.037	85.0	2:30 P	54.0	5 A	69.5	68.9	63.5	11.7
2	30 02	29.82	29.920	87.5	2:30 P	60 5	5 A	74.0	73.6	68.5	12.3
3	30.06	29.83	29.937	78.0	11:30 A	63 0	12 P	70 5	69 0	63.3	5.5
4	30.18	30.06	30.134	68 0	1:30 P	54 0	6 A	61.0	62.2	54.7	10.5
5	30.12	29.87	29.979	58 0	0 A	48.0	12 P	53.0	51.3	49.5	0.0
6	29 88	29.84	29 847	63.0	4 P	48.0	0 A	55.5	53.9	51 7	2.7
7	29.96	29 85	29.911	63 0	3 P	51.0	5 A	57 0	57.7	52.0	7.7
8	30.01	29.95	29.980	64.0	6 P	46 0	5 A	55.0	56.4	52.5	7.0
9	30.07	29 99	30.032	78.0	4 P	48.0	5 A	63 0	63.5	56 5	8.0
10	30.07	29.90	29.990	83.0	5 P	47.5	5 A	65.3	65.4	58.3	10.5
11	29 96	29.82	29.897	88.0	2 P	55 5	5 A	71.7	70.7	62.0	9.3
12	30 02	29.91	29.977	80.0	1:30 P	63.0	12 P	71.5	70 6	62 3	9 5
13	30.00	29.87	29.932	63.0	0 A	55.0	9 A	59.0	58.0	54.3	0.0
14	29.90	29.76	29.822	84 0	3:30 P	54.0	6 A	69 0	68.7	61.7	12.0
15	29.82	29 65	29 706	82.5	1 P	61.5	5:30 A	72 0	70.2	62.3	9.5
16	29.65	29.54	29 556	75.0	3 P	60.0	12 P	67.5	66 7	64 0	4 4
17	29.79	29.65	29.714	60.0	0 A	51.0	12 P	55.5	54.6	53.0	0.0
18	30.00	29.79	29 926	54 0	12 M	48.0	12 P	51.0	50.3	48.7	0.0
19	30.13	29.99	30.082	71.0	4 P	46.5	3:30 A	58 7	58 2	54.5	11 0
20	30.18	30.10	30.144	75.5	4 P	45.0	6 A	60.3	60.5	58.0	12.0
21	30.12	29.74	29.822	61.0	12 P	52.0	7 A	56.5	56 7	56.0	0.5
22	29.86	29.74	29 810	75.0	12 M	61.0	6 A	68.0	66.8	63 0	7.0
23	30 10	29.86	30.034	79.0	2 P	57 0	5 A	68.0	67.9	63.0	12.0
24	30.15	30.10	30.136	80 0	5 P	49.0	6 A	64.5	68.9	62.0	12.4
25	30.14	30 07	30.136	82.0	5 P	57.0	12 P	69 0	69 3	59.5	12.8
26	30.27	30.14	30.228	83.5	4 P	49.5	5 A	66.5	68.9	62.0	13.7
27	30.32	30.20	30.264	88 0	4 P	53 0	6 A	70.5	72.1	63.7	13.0
28	30.20	29.94	30.049	83.5	12 M	57.0	5:30 A	70.3	71.3	68.0	9.8
29	29 94	29.79	29.850	83.5	1 P	64 0	12 P	73 7	70.5	67.7	6.7
30	29.83	29.69	29 702	82.0	4 P	64.5	3 A	73.3	71.3	70 5	9.5

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	58 5	.720	73.0	S.S.W.	122	1.5	17	5 P				
2	67 0	.805	82.0	S.	171	3.0	24	5 P				
3	69.5	.784	87.0	W.N.W.	102	1.0	14	1 P	1:30 P	3 P	.04	
4	49.5	.551	62.5	N.N.E.	107	1.0	14	2 A				
5	48.5	.364	93.5	N.	135	0.5	10	8 A	1 A	12 P	.61	
6	50.0	.347	86.5	W.N.W.	113	0.5	10	1 P	0 A	2 P	.17	
7	47.5	.473	69.5	N.N.W.	201	2.5	22	11 P				
8	47.5	.493	67.0	N.N.E.	68	0.5	10	9 A				
9	52.0	.569	69 0	N.E.	97	1.0	14	1 P				
10	54 5	.675	69.5	S.W.	84	0.5	10	8 P				
11	58.5	.709	72.0	N.N.W.	117	0.5	10	5 P				
12	57.0	.750	64.0	N.N.E.	127	1.0	14	1 P				
13	53.0	.460	86.5	S.	105	0.0	—	—	2 A	10 A	.15	
14	57.5	.730	70.0	N.N.W.	70	1.0	14	5 P				
15	60.0	.648	83.0	S W.	88	3.0	24	4 P	3 P	12 P	.32	
16	62.5	.643	88.0	N.N.E.	38	0.5	10	10 P	0 A	5 P	.14	
17	51.0	.403	86 5	N.E.	90	0.5	10	10 P	0 A	12 P	2.46	
18	48.5	.362	90.5	N.N.E.	140	0.5	10	10 A	0 A	5 P	.36	
19	51.0	.485	77.0	N.N.E.	51	1.5	17	11 A				
20	54.5	.546	76 0	S.	65	2.0	20	7 P				
21	55 0	.467	93.0	N.	53	3.0	24	1 P	2 A	5 P	.35	
22	61 5	.633	87.5	S.	72	2.5	22	2 P	8 A	1 P	.06	
23	64.0	.670	76.0	S.S.W.	90	0.0	—	—				
24	58 5	.657	74.5	S.S.W.	30	0.0	—	—				
25	53.5	.729	58.5	N.N E.	124	2.5	22	3 P				
26	57.0	.732	64.5	E.N.E.	95	1.0	14	12 M				
27	59.0	.760	67.5	S.	47	0.5	10	4 P				
28	65.5	.815	78.5	S.S E.	87	0 5	10	12 M	1 P	2 P	T	
29	65.5	.754	82.5	S.	198	3.5	26	3 P	1:30 P	9 P	1.40	
30	69.5	.754	88.5	S.	168	1.5	17	1 P	5 P	6 P	.20	

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during June was more nearly normal than for some months past, although having some unusual features. The temperature was a little lower than usual and high temperatures were not registered. Some unusually heavy rain-storms occurred and the percipitation was very large. The ground in many places is excessively wetand growing crops have not made good progress. The last week of the month was good summer weather.

The records of the several weather elements show the following features of interest: The mean barometer was practically normal and the range about the usual amount. The total wind movement was small and not a single gale was recorded. The wind direction was rather variable and an unusually large amount was from the South.

The mean temperature was slightly lower than the normal and the range was very small. This was due to a rather low maximum and a minimum more than five degrees higher than usual. Two periods of low temperature were noted; the first covering the time from the 4th to the 8th, and the second extending from the 16th to the 22d.

The mean dew point was practically normal and the relative humidity about 5 per cent higher than usual.

The total precipitation was nearly twice the normal for June and practically one-half of it fell during a rainy period about the middle of the month. On the 29th a very heavy thunder shower with some hail and shifting wind occurred and more than an inch of rain fell in about an hour.

The amount of sunshine was slightly less than the normal.

J. E. OSTRANDER, Meteorologist.

G. E. LINDSKOG, Acting Observer.

BULLETIN No. 379. JULY, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing	29.95, 11th, 8 A
Minimum reduced to freezing	29.23, 24th, 4 A
Reduced maximum reading	30.24, 11th, 8 A
Reduced minimum reading	29.52, 24th, 4 A
Mean semi-daily reduced	29.961
Monthly range	0.72

***Air Temperature.** In Degrees Fahr.

Highest	87.5, 13th, 3:30 P
Lowest	45.0, 26th, 5 A
Mean hourly	68.3
Mean of means of max. and min.	68.7
Mean sensible (wet bulb)	63.7
Monthly range	42.5
Highest mean daily	74.4, 13th
Lowest mean daily	59.7, 26th
Mean maximum	80.0
Mean minimum	57.5
Mean daily range	22.5
Greatest daily range	36.5, 27th
Least daily range	9.0, 3d

Humidity.

Mean dew point	60.9
Mean force of vapor	.686
Mean relative humidity	77.6

Precipitation. In inches.

Total precipitation, in inches	2.06
Number of days on which .01 inch or more rain fell	10

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3817 m
Greatest daily movement	239m, 4th
Least daily movement	33m, 27th
Mean daily movement	123m
Mean hourly velocity	5.1m

Maximum pressure per square foot, 7.5 lbs= 39m per hour, 4th, 4 P, W.N.W.

Maximum velocity for 5 minutes, 27m per hour, 4th, 2P, W.N.W.

Prevailing direction, Southwest.

Summary.

South Southwest	23 per cent
South	32 " "
Other directions	45 " "

Weather.

Mean cloudiness observed	50 per cent
Total cloudiness recorded by the Sun Thermometer	140 hours = 30 per cent.
Number of clear days	15
Number of fair days	13
Number of cloudy days	3

Bright Sunshine.

Number hours recorded, 322 hrs, 70 = per cent.

Rain. 2d, 3d, 7th. 9th, 12th, 15th, 18th, 19th, 23d, 24th, 30th, 31st.

Thunder and Lightning. 9th. 15th, 20th, 22d, 23d, 24th, 30th, 31st.

Gales. 39m, 4th, W.N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29 91	29.75	29 844	80.0	4 P	58.0	5 A	69 0	69.1	63.5	13.7
2	29.92	29.78	29 855	79 5	3:30 P	54.5	5 A	67.0	68.0	62.5	10.3
3	29.79	29.60	29.635	66.0	5:30 P	57.0	12 P	61.5	62.7	61 5	3.2
4	29.77	29 60	29.680	71.0	12 M	56.0	3 A	63 5	61 5	57.0	10.0
5	29 98	29.76	29.856	74.0	3 P	56.0	12 P	65.0	64.5	59.7	11.5
6	30.05	29.98	30.016	81.5	4 P	50.0	5:30 A	65.7	66.8	62.0	13.0
7	30 02	29 83	29.910	81.5	2:30 P	62.0	5 A	71 7	70.2	66.0	7.0
8	29.98	29 85	29.918	80.0	11 A	60 0	12 P	70.0	72.1	66.5	12.0
9	30 10	29.97	30.068	82.0	2 P	53 5	5:30 A	67.7	67.4	63.3	9.5
10	30.18	30.06	30.138	83.5	4 P	59.0	6 A	71 3	69.8	64.5	11.8
11	30 24	30.15	30.200	86.5	3 P	57.0	5:30 A	71.7	70 8	66 0	12.0
12	30.15	30 05	30.098	81.5	3:30 P	66 0	12 P	73.7	70.5	67.0	4 3
13	30.17	30.10	30.136	87.5	3:30 P	63.0	5:30 A	75.3	74.4	68.5	13 0
14	30.11	29 88	29.978	85.0	2:30 P	66 0	5 A	75.5	73.8	70.3	8.8
15	29.88	29.85	29.878	80.5	4:30 P	62.0	12 P	71.3	71.9	67.7	3.7
16	30.03	29.90	29 993	75.0	3:30 P	54.0	12 P	64.5	64 0	56.5	13.0
17	30.16	30 04	30 085	74 0	5 P	51.5	6 A	62.7	62.2	55.7	12.7
18	30.18	30.03	30 116	78 0	2:30 P	45.5	6 A	61.7	62.4	60.5	9 0
19	30.03	29.80	29.838	82.0	2 P	62.5	5 A	72 3	71.7	69 5	8.7
20	30.16	29.91	30 076	81.0	5 P	61.0	5 A	71.0	68.8	63 0	13.0
21	30.15	30.03	30.090	82 0	3 P	53.5	5 A	67.7	69.4	65.5	12.0
22	30.05	29.95	30.002	86.0	2:30 P	64.0	6 A	75.0	73.3	69.7	10.7
23	29 95	29.70	29.802	81.5	2:30 P	66.0	5 A	73.7	72.9	70.5	9.4
24	29.76	29.52	29.594	82 0	1:30 P	66.0	12 P	74.0	71 8	66.7	6.6
25	30.00	29.76	29.889	72.0	1:30 P	53.0	12 P	62.5	64.3	57.7	13.4
26	30.02	29.99	30.009	72.0	5 P	45.0	5 A	58.5	59.7	56.7	13.7
27	30.10	30.02	30.058	82.0	5:30 P	45 5	5:30 A	63.7	62 9	57.7	13.0
28	30.19	30.10	30.155	85.5	4:30 P	50.5	6 A	68.0	68.1	63.3	13.0
29	30.17	30.05	30.114	83 0	2:30 P	58.5	5:30 A	70.7	71.0	65.3	12.0
30	30.08	29.88	29.946	79 0	4 P	62.0	5 A	70-5	69.5	66.0	9.0
31	29.95	29.75	29.819	84.0	3:30 P	64.0	12 P	74.0	71.3	65.7	8.6

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	61.0	.679	81.0	N.	90	0.5	10	1 P				
2	58.5	.700	67.0	S.	108	2.0	20	3 P	5 P	7 P	T	
3	60.5	.577	89.5	N.N.E.	113	0.5	10	2 P	6 A	3 P	.36	
4	53.0	.560	72.5	W.	239	7.5	39	4 P				
5	57.0	.596	79 0	W.N.W.	183	1.5	17	11 A				
6	56.5	.685	64.5	S.S.W.	63	1.0	14	4 P				
7	63.5	.721	80.0	S.	215	3.5	26	3 P	2 P	3 P	T	
8	64.0	.748	80.0	W.N.W.	215	1 0	14	3 P				
9	60.5	.644	79.5	S.	111	2.5	22	2 P	1 P	8 P	.01	
10	62.0	.682	76.0	S.W.	67	0.0	—	—				
11	62.5	.746	73 0	S.	36	1.5	17	10 P				
12	66.0	.700	89.0	S.	112	0.5	10	3 P	2 P	4 P	.24	
13	64 5	.858	67.5	S.S.W.	110	3.0	24	11 A				
14	68.5	.818	83.0	S.	219	0.5	10	1 P				
15	65.0	.784	78 0	W.S.W.	77	0.0	—	—	9 A	3 P	.03	
16	51 0	.563	66.0	W.	87	0.0	—	—				
17	49.5	.563	64 5	N.W.	52	0 5	10	4 P				
18	57.0	.587	77.0	S.	79	1.5	17	11 A	3:30P	8 P	.09	
19	69.0	.782	90.5	S.S W.	168	2.5	22	2 P	1 A	9 A	.34	
20	59.5	.682	77.0	N.N.W.	104	1.5	17	1 P				
21	62.0	.748	70 5	S.S.W.	86	1.0	14	1 P				
22	68.0	.818	82 0	S.	105	0.0	—	—				
23	69.5	.809	88.5	S S.W.	160	1.5	17	1 P	2 A	12 P	.34	
24	64.5	.750	81.5	N.W.	183	1.5	17	12 M	0 A	3 A	.20	
25	53.5	.589	71 0	N.	137	1.0	14	12 M				
26	54.0	.537	77.5	N.N.W.	79	0.5	10	4 P				
27	54.5	.553	76.5	S.W.	33	0.0	—	—				
28	60 5	.694	76.0	S S.W.	35	0.5	10	5 A				
29	62.5	.745	75.5	S.	174	2.5	22	4 P				
30	64.0	.730	82.0	S.	232	2.0	20	11 A	12 M	1 P	.02	
31	65.5	.619	90.0	S.S.W.	145	2.0	20	2 P	3 A	12 P	.43	

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The most noticeable feature of the weather during the month was the general absence of high temperatures. The maximum temperature was well below 90 degrees, and on more than one-third of the days the maximum did not reach 80 degrees,—a very unusual record for July. There were several cool periods of about three days' duration, notably the 3d-5th, the 16th-18th and the 25th-27th. During this last period the minimum of the month was reached. Another feature was the rather small precipitation, although there was a large number of thunder storms.

The records of the several weather elements, when compared with their respective normals, show the following features of interest: The mean barometer was practically normal and the range about the usual value. The maximum and minimum pressures were both slightly higher than their normals. The total wind movement was a little more than usual, and only one gale was recorded. During more than one-half the time the wind was from the South or South Southwest,—a rather unusual record here.

The mean temperature was more than two degrees lower than usual, and the maximum temperature was more than six degrees below the normal record for this feature. The minimum temperature was practically normal.

The mean dew point was practically normal and the relative humidity several points higher than usual, owing to the generally low temperature record.

The total precipitation was less than one-half the normal and was well distributed throughout the month.

The amount of sunshine recorded was greatly in excess of the normal.

J. E. OSTRANDER, Meteorologist.

G. E. LINDSKOG, Acting Observer.

BULLETIN No. 380. AUGUST, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.11, 19th, 8 A
Minimum reduced to freezing,	29.33, 31st, 1 P
Reduced maximum reading	30.40, 19th, 8 A
Reduced minimum reading,	29.62, 31st, 1 P
Mean semi-daily reduced	30.061
Monthly range	0 78

***Air Temperature.** In Degrees Fahr.

Highest	92.0, 8th, 2:30 P
Lowest	46.5, 21st, 6 A
Mean hourly	70.2
Mean of means of max. and min.	71.8
Mean sensible (wet bulb)	65.5
Monthly range	45.5
Highest mean daily	76.4. 9th
Lowest mean daily	63.3, 20th
Mean maximum	82.6
Mean minimum	61.0
Mean daily range	21.6
Greatest daily range	35.5, 21st
Least daily range	11.0, 15th

Humidity.

Mean dew point	63.5
Mean force of vapor	.707
Mean relative humidity	84.3

Precipitation. In inches.

Total precipitation, in inches	3 62
Number of days on which .01 inch or more rain fell	15

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	2802 m
Greatest daily movement	243m, 23d
Least daily movement	40m, 26th
Mean daily movement	90m
Mean hourly velocity	3.8m

Maximum pressure per square foot, 6.0 lbs= 35m per hour, 31st, 1P, W.

Maximum velocity for 5 minutes, 36m per hour, 31st, 1P, W.

Prevailing direction, South Southwest.

Summary.

South Southwest	39 per cent
South	23 " "
North Northeast	13 " "
North	10 " "
Other directions	15 " "

Weather.

Mean cloudiness observed	55 per cent
Total cloudiness recorded by the Sun Thermometer	167 hours = 39 per cent.
Number of clear days	4
Number of fair days	22
Number of cloudy days	5

Bright Sunshine.

Number hours recorded, 262 hrs, 61 = per cent.

Rain, 1st, 2d, 7th, 10th, 11th, 13th, 14th, 15th, 16th, 18th, 19th, 21st, 29th, 30th, 31st.

Thunder and Lightning, 10th, 11th, 13th, 30th, 31st.

Gales, 35m, 31st, W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean, Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29 90	29.78	29 844	77.0	2 P	62.0	7:30 A	69.5	66.7	60.7	7.9
2	30.04	29 90	29 948	77.0	2:30 P	58.0	6 A	67.5	66.6	60.3	10.3
3	30.22	30.04	30.174	80 5	4 P	52.5	6 A	66.5	65.4	59 3	13.2
4	30.28	30 18	30.234	80.0	3 P	52.0	6 A	66.0	66.5	62.5	11.8
5	30 22	30.16	30 195	85.5	3 P	55 0	6 A	70.3	69.5	65.7	11.2
6	30.21	30.08	30.148	83.0	4:30 P	60.0	6 A	71.5	69.9	66.3	10.5
7	30 12	29 98	30.024	80.5	4:30 P	65.0	6 A	72.7	71.5	69 5	6.6
8	30.07	30 02	30.068	92.0	2:30 P	64 0	6 A	78.0	75.5	68.7	10.0
9	30 13	30.02	30.078	89.5	1:30 P	64 5	5 A	77.0	76.4	70.7	10.3
10	30.04	29.89	29 944	85.5	4 P	70.0	5 A	77.7	74 7	72.5	6.1
11	29.99	29.87	29.906	85 5	5:30 P	67.0	12 P	76.3	73 5	70.5	6.0
12	29.99	29 92	29.937	86.0	3 P	65.0	5 A	75.5	73 4	71.3	8 2
13	30.02	29.93	29 972	82 5	4 P	71.0	5 A	76.7	74.0	72.3	5.3
14	30.03	29 98	30 003	82.5	1 P	71 0	7 A	76.7	74.0	71.5	4.0
15	30.08	29.98	30.026	78.5	11:30 A	67.5	12 M	73.0	72.9	71.3	2.1
16	30.04	29.98	30 000	82 5	12:30 P	69.0	12 P	75.7	72.9	70.5	4.0
17	30 13	30 02	30 070	90.0	3:30 P	69.5	6 A	79.7	75.8	71.7	8.2
18	30.32	30.13	30 257	76.5	3 P	64.0	12 P	70.3	69.5	64.7	2.4
19	30.40	30.31	30.374	78 5	2:30 P	61.0	2 A	69.7	67.0	61.3	7.9
20	30.36	30.20	30 280	77.5	2 P	51.0	6 A	64.3	63.3	57.5	10.9
21	30.22	29.97	30.068	82.0	3:30 P	46.5	6 A	64.3	64.7	59.7	11.4
22	29.97	29.86	29 882	87 5	3:30 P	65.0	12 P	76.3	75.6	72.0	10.0
23	30 08	29.98	30.046	77.0	5:30 P	59.0	12 P	68.0	66.4	58.5	10.7
24	30.12	30.05	30.090	82 5	4 P	54.0	6 A	68.3	66 2	59.5	12.3
25	30.16	30.08	30.156	81.0	2:30 P	53 0	6 A	67.0	66.7	62.0	9.2
26	30.28	30.16	30.268	84.5	3:30 P	55.0	6 A	69.7	68 6	63 0	10.4
27	30 27	30.15	30.220	85.5	3:30 P	56 5	6:30 A	71.0	69 6	61.3	10.2
28	30.16	30.06	30.104	85.0	3:30 P	56.5	6 A	70.7	69.1	61.5	9.1
29	30.08	29 97	30.016	80 5	1:30 P	62.5	6 A	71·5	68.9	64.0	6.8
30	29.98	29.74	29 898	83 5	5:30 P	64.0	6 A	73.7	71.7	68.5	6.6
31	29.79	29.62	29.699	82.5	12 M	61.5	6:30 A	72.0	68.5	62.5	8.8

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	58.0	.612	79.5	W.S.W.	58	0 5	10	2 A	0 A	2 A	.04	
2	57.0	.635	79.5	N.N.E.	66	0.0	—	—	0 A	5 A	.01	
3	55.0	.583	77.0	N.	86	0.0	—	—				
4	60.5	.650	80.5	E.	69	0.0	—	—				
5	64.0	.614	83.0	S.W.	64	0.0	—	—				
6	64.5	.702	89.0	S.	62	0 0	—	—				
7	68.5	.783	93.0	S.S.W.	69	0.0	—	—	2 A	12 M	.02	
8	66.5	.800	83.0	S.	96	0 5	10	3 P				
9	69.5	.834	88.0	S.	125	2.0	20	3 P				
10	71.0	.855	88.5	S.S.W.	198	1.5	17	12 M	2 A	12 P	.65	
11	70.5	.763	96 5	S.S.W.	93	1.5	17	11 P	0 A	11:30 P	.98	
12	70.5	.810	92.5	S.	45	0.0	—	—				
13	72.0	.825	94.5	S.	64	0.5	10	9 P	0 A	12 P	.21	
14	70.5	.816	92.0	S.	142	1.0	14	7 P	0 A	5 P	.55	
15	70.5	.806	93 0	S.S.W.	88	0.5	10	1 P	0 A	12 M	.04	
16	70 0	.772	94.0	S.S.W.	65	0.0	—	—	1 P	12 P	.65	
17	70.5	.836	92.0	N.	62	0 0	—	—				
18	63.0	.682	85.0	E.N E.	80	0.5	10	8 A	0 A	4 A	.28	
19	59.5	.584	88.5	N.N.E.	63	0.0	—	—	2 A	4 A	.02	
20	55.0	.526	84.0	S.S.W.	75	0.0	—	—				
21	57 5	.595	82.0	S.	75	1.0	14	6 P	8 P	12 P	.03	
22	70.0	.889	83 5	S.S W.	139	1.5	17	11 P				
23	55.0	.587	74.0	N.N.E.	243	2 0	20	10 A				
24	56.0	.614	67.5	N.	91	0 0	—	—				
25	59 0	.638	81.0	N.N.E.	51	0.0	—	—				
26	61.0	.663	80.5	W.	40	0.0	—	—				
27	58.5	.646	77.0	S.S.W.	41	0.0	—	—				
28	58 5	.640	78.0	S.S.W.	90	0.5	10	6 P				
29	62.0	.661	85.0	S.S.W.	76	0.0	—	—	0 A	6 P	.01	
30	67.5	.760	88.0	S.S.W.	140	0.5	10	3 P	9:30 P	10 P	.01	
31	57.5	.742	65.0	S.S.W.	146	6 0	35	1 P	12:30 P	2 P	.12	

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during the month was marked by high humidity, numerous small showers and a rather high temperature. While the wind movement was small it came from near the South point of the compass for an unusually large part of the time. The days seemed to be less cloudy than the nights.

A comparison of the records of the several weather elements with their respective normals shows the following interesting features: The mean barometer was considerably higher than the normal and the range slightly more than usual. Changes in barometric pressure were as a rule rather slow and unimportant. The total wind movement was about ten per cent less than normal, and only one gale was recorded.

The mean temperature was about two degrees higher than the normal and the mean of the maximum and minimum temperatures considerably higher than the mean hourly. This was due to the fact that the period of high temperature during the day was usually rather short. The maximum and minimum temperatures were both higher than their respective normals.

The highest temperature of the year so far was recorded on the 8th. The range of temperature for the month was smaller than usual.

The mean dew point was more than three degrees higher than usual and the relative humidity was more than seven points above the normal.

The total precipitation was about one-half inch less than the normal. The only heavy rainstorm was that of the 10th—11th.

The amount of sunshine was large and only a few days were classed as cloudy.

J. E. OSTRANDER, Meteorologist.

G. E. LINDSKOG, Acting Observer.

BULLETIN No. 381. SEPTEMBER, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

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Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.07, 22d, 9 A
Minimum reduced to freezing,	29.05, 30th, 12 P
Reduced maximum reading	30.37, 22d, 9 A
Reduced minimum reading,	29.35, 30th, 12 P
Mean semi-daily reduced	29.990
Monthly range	1.02

***Air Temperature.** In Degrees Fahr.

Highest	90.0, 26th, 4:30 P
Lowest	37.0, 20th, 6 A
Mean hourly	62.8
Mean of means of max. and min.	64.1
Mean sensible (wet bulb)	57.4
Monthly range	53.0
Highest mean daily	70.2, 26th
Lowest mean daily	51.5, 20th
Mean maximum	75.7
Mean minimum	52.4
Mean daily range	23.3
Greatest daily range	36.0, 4th
Least daily range	6.0, 10th

Humidity.

Mean dew point	55.5
Mean force of vapor	.541
Mean relative humidity	83.9

Precipitation. In inches.

Total precipitation, in inches	6.74
Number of days on which .01 inch or more rain fell	12

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3411 m
Greatest daily movement	292m, 17th
Least daily movement	16m 25th
Mean daily movement	114m
Mean hourly velocity	4.8m

Maximum pressure per square foot, 6.0 lbs = 35m per hour, 30th, 7P, S.

Maximum velocity for 5 minutes, 36m per hour, 30th, 7P, S.

Prevailing direction, West Southwest.

Summary.

South Southwest	10 per cent
South	13 " "
North Northeast	13 " "
North	10 " "
South Southeast	17 " "
Other directions	37 " "

Weather.

Mean cloudiness observed	52 per cent
Total cloudiness recorded by the Sun Thermometer	130 hours = 35 per cent.
Number of clear days	8
Number of fair days	17
Number of cloudy days	5

Bright Sunshine.

Number hours recorded, 243 hrs, 65 = per cent.

Rain, 1st, 2d, 6th, 7th, 10th, 12th, 13th, 16th, 18th, 27th, 28th, 30th.

Thunder and Lightning, 12th, 13th, 30th.

Gales, 35m, 30th, S.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29 94	29.68	29.787	72.0	3 P	52.0	12 P	62.0	62.7	57.5	10.5
2	30.12	29 94	30.049	71.5	3 P	45.0	6:30 A	58.3	57.8	53.7	12.0
3	30.15	30.08	30.123	77.5	4 P	43.0	6 A	60.3	59.2	51.5	11.8
4	30.18	30.09	30.130	79 5	4:30 P	43.5	6:30 A	61.5	60.5	52.7	10.4
5	30.17	30.13	30.156	79.5	4:30 P	44 5	6 A	62.0	62.2	56 3	11.5
6	30.17	29.94	30.043	76.0	3 P	51.5	6 A	63.7	64 3	61.0	7.5
7	29 94	29.86	29.913	79 5	3 P	61.0	12 P	70.3	67.2	62.0	6.2
8	30.03	29.88	29.935	77.0	3 P	57 5	6 A	67.3	66.5	60.3	10.9
9	30.09	29.96	30.021	80.0	3 P	48 5	6 A	64 3	65.0	58 0	10.8
10	29.96	29.78	29 812	65 0	0 A	59.0	12 P	62.0	61.2	58.3	0.0
11	29.92	29 85	29.886	77 5	3:30 P	57.5	6 A	67.5	64.9	59.7	8 3
12	29.89	29.59	29.642	82 0	4 P	62.0	6 A	72 0	68.5	64.5	6.1
13	29.80	29.60	29.672	75.0	1 P	60.0	12 P	67.5	64.8	57.7	6.0
14	30.03	29.80	29.902	70 5	2:30 P	53 0	6 A	61.7	61.5	57.0	9.4
15	30.12	30 03	30.077	68.0	4 P	58 0	0 A	63.0	62.5	59.3	5 7
16	30.04	29.77	29 848	68.5	5:30 P	60.0	12 P	64.3	63.8	59.5	2.0
17	29.97	29.82	29.902	67.0	3 P	48.0	6 A	57.5	58.3	49.3	11.5
18	30 01	29 69	29 812	76.0	2:30 P	49.5	6 A	62 7	63.5	56.5	8.1
19	30.14	29 89	30.084	62.0	3 P	42.0	6:30 A	52.0	51.7	46 0	11.5
20	30.24	30.13	30.218	64.0	2:30 P	37 0	6 A	50.5	51.5	48.3	8.5
21	30.35	30.24	30.325	71.0	3:30 P	46.0	6 A	58-5	56.2	50.5	8.5
22	30 37	30 28	30.324	73.5	3:30 P	49.0	4:30 A	61.3	59.2	54.0	8.6
23	30.30	30.18	30.245	81.0	3:30 P	48 G	6:30 A	64 5	63 2	60.3	8.5
24	30.17	30.02	30.121	86.5	3 P	56.0	6 A	71.3	66.4	62.3	8.3
25	30.15	30.04	30.110	89.0	3 P	58.0	6 A	73.5	68 6	62.0	9.0
26	30.14	30.05	30.105	90.0	4:30 P	56.0	7 A	73.0	70.2	63.0	10.8
27	30.15	30.00	30 097	85 5	1:30 P	55.5	7 A	70.5	67.3	60.5	7.8
28	30.00	29.85	29.897	75.0	12 M	63.0	6 A	69.0	67.4	67.0	3.7
29	29.76	29.86	29.903	80.0	4 P	51.0	7 A	65.5	63.8	58 0	9.1
30	29.88	29.35	29.571	73.0	7 P	58.5	5 A	65.7	64.7	65.3	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	54.5	.574	76.5	N.N.W.	170	2 5	22	10 A	4 A	5 A	.02	
2	47.5	.458	71.5	N.	149	3.0	24	11 A	8:30 P	9 P	.02	
3	47.5	.458	71.0	N.N.E.	64	0.0	—	—				
4	50.0	.464	80 5	S.W.	18	0.0	—	—				
5	53 0	.524	78.5	S.S.W.	37	0.0	—	—		*		
6	59 0	.606	83.5	N.E.	90	0 0	—	—	9:30 P	12 P	.03	
7	59.5	.644	80.0	N.	104	0 5	10	6 P	0 A	5 P	.09	
8	57 5	.619	77 0	N N.W.	141	1.5	17	9 A				
9	56.0	.548	82.5	S.	58	0.0	—	—				
10	57.0	.510	91 5	N.E.	99	0.0	—	—	0 A	4 P	1.18	
11	57.5	.580	82.0	S.S.E.	66	0.5	10	9 P				
12	63.0	.654	89.0	S.	137	2.0	20	5 A	0 A	12 P	.54	
13	55.0	.541	81 5	N.	160	2.5	22	3 P	0 A	9 A	.04	
14	53 5	.548	75.0	N.N.E.	280	3.0	24	12 M				
15	56.5	.569	80 5	N.N.E.	108	0.0	—	—				
16	58 0	.558	86 5	S S.E	145	2.0	20	4 P	4 A	9 P	.15	
17	44.0	.432	67.0	N.W.	292	3 5	26	12. M				
18	52.0	.589	78.5	S.W.	190	1.5	17	5 P	10 P	11 P	.07	
19	42.5	.345	77.0	W.S W.	229	1.5	17	2 P				
20	46.0	.373	85.5	W.	64	0 0	—	—				
21	48.5	.406	84.5	W.	68	0.0	—	—				
22	52.0	.451	86.0	S.	97	0.5	10	2 P				
23	60 0	.557	96 0	S.S.E.	55	0 0	—	—				
24	62.0	.586	96.0	S.S.E.	27	0.0	—	—				
25	61.0	.601	89.0	S.S.W.	16	0.0	—	—				
26	62.0	.611	92 5	N.W.	35	0.0	—	—				
27	60.0	.557	95 0	S.S.E.	67	1.0	14	6 P	11 P	12 P	.04	
28	66.5	.684	95.0	S.	196	2.5	22	9 A	3 P	11 P	1.16	
29	57.0	.513	92.5	S.S.W.	83	0.0	—	—				
30	65.0	.658	96.5	S.	166	6.0	35	7 P	1 A	12 P	3.40	

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during September was in general seasonable, although presenting several marked characteristics. One of the most prominent features was the absence of frost up to the end of the month. On the 20th light frost was noted in some places in the vicinity, but no damage was done. At the station not even a trace was observed. Following the 20th there was much foggy weather and a very high humidity. The highest temperatures of the month were registered near the end of the month. On the 30th one of the heaviest rainstorms ever noted at this station occurred, accompanied by a rapid fall of the barometer. The month closed with high wind and rain.

The mean barometer was rather low and the range considerably more than usual. The maximum and minimum pressures were both below their respective normals. The total wind movement was practically normal and more variability than usual was noted on the wind direction chart. The only gale recorded was during the storm of the 30th.

The mean temperature was one and one-half degrees higher than the normal, and both the maximum and minimum temperatures were several degrees higher than usual. The mean of maximum and minimum temperatures was considerably higher than the mean hourly temperature, due to the fact that the period of high temperature each day was only a few hours at the most.

The mean dew point and relative humidity were both considerably higher than the normal.

The total precipitation was nearly twice the normal amount and about one-half of it fell on the last day of the month. The amount of sunshine was large.

J. E. OSTRANDER, Meteorologist.

H. W. POOLE, Observer.

BULLETIN No. 382. OCTOBER, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.10, 18th, 9 A
Minimum reduced to freezing,	28.97, 1st, 3 A
Reduced maximum reading	30.39, 18th, 9 A
Reduced minimum reading,	29.26, 1st, 3 A
Mean semi-daily reduced	30.071
Monthly range	1.13

***Air Temperature.** In Degrees Fahr.

Highest	81.5, 9th, 3:30 P
Lowest	29.5, 7th, 6 A
Mean hourly	55.4
Mean of means of max. and min.	56.4
Mean sensible (wet bulb)	51.3
Monthly range	52.0
Highest mean daily	66.8, 22d
Lowest mean daily	41.8, 30th
Mean maximum	68.4
Mean minimum	44 4
Mean daily range	24.0
Greatest daily range	44.0, 7th
Least daily range	9.5, 5th

Humidity.

Mean dew point	49.3
Mean force of vapor	.417
Mean relative humidity	86.7

Precipitation. In inches.

Total precipitation, in inches	1.54
Number of days on which .01 inch or more rain fell	6

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	3188 m
Greatest daily movement	349m, 1st
Least daily movement	0 m 6th
Mean daily movement	103m
Mean hourly velocity	4.3 m

Maximum pressure per square foot, 12.0 lbs = 49m per hour, 1st, 3A, S.S.W.

Maximum velocity for 5 minutes, 40m per hour, 1st, 2A, S.S.W.

Prevailing direction, West Southwest.

Summary.

South Southwest	23 per cent
Southwest	13 " "
North Northwest	10 " "
Northwest	10 " "
West Southwest	10 " "
West	10 " "
Other directions	24 " "

Weather.

Mean cloudiness observed	48 per cent
Total cloudiness recorded by the Sun Thermometer	148 hours = 43 per cent.
Number of clear days	9
Number of fair days	10
Number of cloudy days	12

Bright Sunshine.

Number hours recorded, 196 hrs, = 57 per cent.

Rain, 1st,5th. 16th, 26th, 27th, 28th, 29th.

Thunder and Lightning, 29th.

Frost, 7th, 24th.

Gales, 49m, 1st, S.S.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	29 84	29.26	29.610	73.0	1 A	48 0	12 P	60.5	59.5	55.5	5.0
2	30.16	29 84	30.067	62.0	3 P	41.5	7 A	51.7	51.4	49.0	10.0
3	30 23	30.11	30.174	71.5	2 P	40.0	6 A	55.7	55.4	52 3	10.0
4	30.11	29.92	30.004	75.5	3 P	49 0	3 A	62.3	60.7	56.3	9.0
5	30.10	29 93	30.010	56.0	3 P	46.5	7 A	51.3	50.9	49.0	3.2
6	30.22	30.10	30.195	62.5	3 P	41.0	6 A	51 7	50.2	46.5	9.0
7	30.21	30.07	30.144	73.5	3:30 P	29.5	6 A	51.5	49 8	43.5	10.0
8	30.14	30.04	30.093	80.0	3:30 P	39.0	7 A	59 5	55.8	51.0	10.0
9	30.15	30.02	30.092	81.5	3:30 P	41.0	7 A	61.3	56 8	51.3	10.2
10	30.06	29 92	29.992	75.0	1:30 P	42.0	7 A	58·5	58.0	50.7	10.0
11	30.17	30.06	30.142	71.0	3 P	38.5	7 A	54.7	54.6	50.5	9.9
12	30.19	30.13	30.154	55.0	4:30 P	40.0	12 P	47.5	49.1	46.7	0.0
13	30.24	30.04	30.148	72.0	3 P	33 0	7 A	52.5	47.9	44 0	8.8
14	30.04	29 95	29.988	74.0	2 P	42.0	5 A	58.0	57.2	51.3	6 3
15	30.18	30.04	30.148	65.5	3 P	48.0	7 A	56 7	56.3	53.3	4.9
16	30.15	30.07	30.134	67.0	4:30 P	52.0	7 A	59.5	56.7	57 0	3 5
17	30.31	30.16	30.250	74.0	4 P	55.0	6 A	64.5	60.5	56.5	6.5
18	30.39	30.29	30.350	63.5	2 P	51.0	4 A	57.3	58 3	56.3	1.0
19	30.29	30.13	30.180	70.0	2 P	52 5	2 A	61 3	59.1	56.0	5.0
20	30.28	30.16	30.240	74.0	3 P	45·5	4 A	59.7	57.8	53.0	8.5
21	30.21	29.99	30.096	80.5	2 P	51 0	7 A	65.7	66.3	60.3	8.5
22	30.09	29.85	29 903	77.0	2 P	64.0	7 A	70.5	66.8	56.0	9.4
23	30.25	30.08	30.220	62.5	3 P	41.0	12 P	51.7	50.8	43.7	9.3
24	30.26	30.08	30.188	69.0	3 P	31.0	3 A	50.0	49.7	44.3	7.3
25	30.08	29 93	30.008	72 0	2:30 P	49.0	6 A	60.5	57.9	53.7	5.7
26	30.12	30.03	30.092	63.0	4 P	51.0	7 A	57 0	55.4	51.3	3.5
27	30.03	29.73	29.887	72.5	1 P	52.5	0 A	62.5	65.7	64.5	1.5
28	29.83	29 72	29.770	67.5	2 A	52.0	12 P	59.7	59.8	56.3	0.0
29	30 00	29.70	29.825	55.0	12 M	37.0	12 P	46.0	46.3	43.0	2.3
30	30.10	30.00	30.076	46.0	3 P	34.0	2:30 A	40.0	41.8	40.0	3.5
31	30.06	29.98	30.021	59.0	3 P	39.0	6 A	49.0	51.3	47.3	4.3

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	53.0	.499	85.5	S.W.	349	12.0	49	3 A	0 A	4 A	.55	
2	47.0	.377	86.5	S.W.	205	2.5	22	2 P				
3	50.0	.439	84.0	S.S.W.	116	1.0	14	1 P				
4	54.0	.513	81.5	S.S.W.	58	0.0	—	—				
5	47.5	.377	87.0	N.	3	0.0	—	—	8 A	11 A	.08	
6	45.5	.330	92.5	N.N.E.	0	0.0	—	—				
7	42.0	.312	90.0	S.W.	8	0.0	—	—				
8	50.0	.401	90.5	S.W.	9	0.0	—	—				
9	50.5.	.401	92.5	S.S.W.	14	0 0	—	—				
10	48.5	.413	83.5	N.W.	88	2.0	20	12 M				
11	49.5	.386	90.5	N.W.	58	1.0	14	1 P				
12	46.0	.327	94.5	N.N.E.	35	0.5	10	3 P				
13	43.0	.308	93.5	W.	13	0 0	—	—				
14	50.5	.413	89.5	N.N.W.	18	0.0	—	—				
15	52.5	.417	95.5	S.S.E.	14	0.0	—	—				
16	52 0	.406	87.5	S.S.W.	36	0.0	—	—	0 A	8 A	T	
17	55.5	.475	91.5	W.S.W.	29	0 0	—	—				
18	56.0	.489	93 0	S.S.W.	35	0.0	—	—				
19	55.0	.469	94.0	S.S.W.	87	0.0	—	—				
20	52.0	.422	93.5	N.N.W.	36	0.0	—	—				
21	59.0	.577	86.0	W.S.W.	121	0.5	10	2 P				
22	49.0	.598	61.0	W.N W.	283	4.0	28	12 M				
23	34.5	.374	53.0	W.	170	0.5	10	10 A				
24	43.5	.318	92.0	S.	156	1.0	14	1 P				
25	53.0	.431	93.0	S.	137	0 5	10	10 A				
26	50 0	.397	92.5	N.	64	5.0	32	11 P	1 A	5 A	.04	
27	63.0	.657	87.5	S.S W.	320	5.0	32	5 P	4 P	12 P	.20	
28	55.0	.476	92.5	N.W.	197	0 0	—	—	0 A	1 P	.55	
29	41.0	.296	88 5	N.N.W.	126	2.0	20	7 P	12 M	3 P	.12	
30	37.0	.273	81.0	W.	251	2.5	22	11 A				
31	43 0	.369	75.5	W.S.W.	152	2 0	20	2 P				

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather during the month was generally pleasant and very mild. Our records show that it was the warmest October since the station was established. No frost occurred until the 7th, and only one other frost, on the 24th, was recorded. Neither of these could hardly be called a killing frost. The precipitation was rather small and after the tail end of the storm that ushered in the month there was practically no more rain until the last week of the month. The last week was generally cloudy.

The records of the several weather elements show the following features of more or less interest: The mean barometer was practically normal and the range of pressure about the usual amount. The minimum pressure was very low for this time of year and occurred at 3 A. M. on the 1st, at the end of the heavy rainstorm which was in progress when the preceding month closed. The maximum barometer was also rather low and came near the middle of the month. The total wind movement was about three-fourths of the normal, and many of the daily records were very small. The wind was rather variable in direction.

The mean hourly temperature was more than five degrees higher than usual, making it the warmest October on our records as referred to above. The maximum temperature was rather high and the temperature reached 80 degrees or more on three days. The minimum temperature was more than six degrees higher than the normal for this record. Owing to the high minimum the range was less than usual.

The total precipitation was about 40 per cent of the normal and was mostly in small storms. The mean dew point and relative humidity were both high.

The amount of sunshine was above the normal and about one-third of the number of days were clear, one-third fair and one-third cloudy.

J. E. OSTRANDER, Meteorologist.

H. W. POOLE, Observer.

BULLETIN No. 383. NOVEMBER, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.30, 29th, 9 A
Minimum reduced to freezing,	29.04, 17th, 3 P
Reduced maximum reading	30.62, 29th, 9 A
Reduced minimum reading,	29 35, 17th, 3 P
Mean semi-daily reduced	30.129
Monthly range	1.27

***Air Temperature.** In Degrees Fahr.

Highest	62.0, 2d, 11 P
Lowest	16.0, 13th, 7 A
Mean hourly	36.9
Mean of means of max. and min.	36.9
Mean sensible (wet bulb)	32.1
Monthly range	46.0
Highest mean daily	49 9. 1st
Lowest mean daily	26.9, 21st
Mean maximum	44.5
Mean minimum	29.3
Mean daily range	15.2
Greatest daily range	31.5, 2d
Least daily range	5.0, 25th, 28th

Humidity.

Mean dew point	26.9
Mean force of vapor	.211
Mean relative humidity	73.9

Precipitation. In inches.

Total precipitation, in inches	4.67
Total snow, in inches	5½
Number of days on which .01 inch or more rain fell	9

*Temperature in ground shelter.

**Reduced to freezing and sea-level

Wind.

Total movement	4268 m
Greatest daily movement	338m, 3d
Least daily movement	27m 7th
Mean daily movement	142m
Mean hourly velocity	5.9 m

Maximum pressure per square foot, 6.5 lbs= 36m per hour, 17th, 9P, W.N.W.

Maximum velocity for 5 minutes, 33m per hour, 17th, 9P, W.N.W.

Prevailing direction, Northwest.

Summary.

North Northeast	23 per cent
West Northwest	13 " "
South Southwest	13 " "
Northwest	10 " "
West Southwest	10 " "
Other directions	31 " "

Weather.

Mean cloudiness observed	65 per cent
Total cloudiness recorded by the Sun Thermometer	207 hours = 70 per cent.
Number of clear days	2
Number of fair days	8
Number of cloudy days	20

Bright Sunshine.

Number hours recorded, 86 hrs, = 30 per cent.

Rain, 1st, 2d, 7th. 9th, 16th, 17th, 21st, 23d, 24th, 25th. 27th.

Snow, 12th, 16th, 21st, 24th, 25th. 27th.

Hail, 16th.

Frost, before the 16th : 4th, 9th, 11th, 12th 13th, 14th.

Gales, 36m. 17th, W.N.W.; 35m, 23d, N. E.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean. Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30.23	29 92	30.062	57.0	11 A	33 0	12 P	45.0	49.9	42.7	2 3
2	30.23	29.53	29.951	62.0	11 P	30.5	3 A	46.3	40.1	37.7	0.0
3	29 86	29.53	29.778	54.0	2:30 P	40.0	12 P	47.0	49.2	40.2	6.3
4	30.00	29 86	29.929	57.0	3 P	32.0	7:30 A	44.5	45.9	37.3	8.3
5	30.29	29 87	30.114	57.0	1 P	39.0	2 A	48.0	48 6	40.5	5.5
6	30.49	30 29	30.432	54.0	2 P	39 0	2 A	46.5	44.6	37 0	7.2
7	30 50	30.22	30 384	45.0	2 P	33 0	4 A	39.0	39 2	34.3	3.1
8	30.22	30.09	30.156	52.0	3 P	36.0	12 P	44.0	42.0	37.5	3.4
9	30.16	29.74	29.952	56 5	9 P	31.0	7 A	43.7	45 0	43.5	0.0
10	30.28	29 73	30.102	57.5	3 A	33.0	12 P	45.3	44 8	36.3	5.8
11	30.34	30.10	30.236	46.0	4 P	23.0	7 A	34.5	32 6	22.7	7.6
12	30.17	29 97	30.066	38.5	11:30 A	25.0	12 P	31 7	29.7	24.0	1.5
13	30 39	30.17	30.352	40.0	3 P	16.0	7 A	28.0	28 5	24 0	8.1
14	30.41	30.32	30.389	44 5	3 P	22.0	6 A	33.3	32.4	26.5	7.8
15	30.42	30.35	30 396	35.5	4 P	21 0	6 A	28.3	29.4	24.7	0.0
16	30.45	30.13	30.362	35 5	2 P	28 0	7 A	31.7	32.4	30.0	0.0
17	30.13	29.35	29 542	39 0	4:30 P	32.5	2 A	35 7	36.5	35.7	0.0
18	30.18	29.75	30.152	46 0	1 P	33.0	7 A	39 5	39.7	32 5	3.8
19	30.15	30.03	30.072	43.0	3 P	29.5	7 A	36.3	38.3	32.3	1.7
20	30.20	30.00	30.102	44.0	1 P	31.0	12 P	37.5	38.3	32.5	0.0
21	30.29	30.15	30.235	31.0	0 A	23 5	7:30 A	27.3	26.9	25.0	0.0
22	30.17	29.99	29.087	37.0	12 P	29.0	0 A	33.0	32 5	31.0	0.0
23	29.99	29.46	29.526	42.0	8:30 A	33.5	12 P	37.7	37.8	37.5	0.0
24	29 92	29.59	29.826	40.0	3 P	32 0	8 P	36 0	34.6	31.7	0.5
25	30.02	29.91	29.927	35.0	4 P	30.0	6 A	32.5	32 9	31.7	0.0
26	30 24	30.02	30.120	37.0	4 P	24.0	7:30 A	30.5	31.5	26.5	4.0
27	30.28	30.24	30.267	35.0	3 P	22.5	7:30 A	30.3	31.6	29.7	0.0
28	30.50	30.26	30.381	35.0	12 M	30.0	12 P	32.5	32.9	30.3	0.0
29	30 62	30.49	30 577	40.0	3 P	21.0	7:30 A	30.5	29.9	21.3	8.6
30	30.49	30.34	30.422	40.0	3 P	23.5	2 A	31.7	30.3	26.0	0.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Total in Inches. Snow.
1	38.0	.324	73.0	W.S.W.	185	2.0	20	2 P	12 M	2 P	T	
2	35.0	.248	84.0	N.N.W.	42	5 5	33	12 P	12 M	12 P	.95	
3	35.5	.292	72.0	W.N.W.	328	5.0	32	0 A				
4	30.5	.274	63 5	S.S.W.	95	1.5	17	8 P				
5	35.0	.297	68.0	W.	260	3.0	24	1 P				
6	27.5	.276	55.0	N.W.	151	1.5	17	2 P				
7	29.5	.222	75.5	N.W.	27	0.0	—	—	7 P	9 P	.03	
8	33.5	.251	76.5	S.S.W.	73	0.5	10	4 P				
9	40.5	.326	85.0	S.S.W.	173	2.5	22	4 P	8 A	10 P	T	
10	30.0	.258	67.0	W.N.W.	300	3 0	24	1 P				
11	11.5	.182	52.0	S.	45	0 0	—	—				
12	17.5	.147	68.5	W.N.W.	236	5 0	32	2 P	8 A	9 A		T
13	16.0	.149	62 5	W.N.W.	229	2.5	22	10 A				
14	19.0	.166	63.0	W.S.W.	123	1.0	14	12 M				
15	16.5	.155	63.0	S.S.E.	33	0.0	—	—				
16	25.5	.178	79.0	N.N.E.	63	0.0	—	—	1 P	12 P	.75	2
17	33.0	.221	85 0	N.N.E.	130	6.5	36	9 P	0 A	2 P	1.02	
18	24.5	.222	60.5	N.W.	306	4 0	28	0 A				
19	25 5	.217	66.5	W.S.W.	149	1.0	14	3 P				
20	28.5	.201	79.0	N.N.E.	101	1.0	14	8 P				
21	23.0	.142	88 0	N.N.E.	145	0.5	10	6 A	5 A	12 P	.25	½
22	27.0	.185	80.0	N.N.E.	52	0.0	—	—				
23	36.0	.235	91.5	N.E.	280	6.0	35	6 A	1 A	12 P	2.27	
24	29.5	.188	87.5	N.N.E.	200	1.5	17	1 A	8 P	12 P	.06	T
25	30 5	.183	92.5	N.N.E.	84	0.5	10	7 P	0 A	10 A	.19	2
26	24.5	.149	88.5	N.	119	0.5	10	6 P				
27	28 0	.170	92.5	S.S.W.	57	0.0	—	—	5 P	12 P	.10	1
28	27 0	.182	82.0	E.N.E.	107	0.5	10	5 P				
29	7.0	.140	45.0	N.	139	0.0	—	—				
30	21.0	.158	72.5	S.	86	0.0	—	—				

**Rain or melted snow at base of tower. * Included in following day.

REMARKS

The weather records for November show that, contrary to the general opinion, the month was slightly colder than usual. The precipitation was large and more than the usual amount of snow was recorded. The most noticeable feature, however, was the large number of dark gloomy days and the great deficiency in sunshine. Another unusual feature was the persistency in wind from the northeast quadrant for about a week during the last part of the month. Two decided low barometric readings were noted on the 17th and 23d respectively.

The records of the several weather elements show the following interesting features: The mean barometer was unnsually high and the range was practically normal. Only eight days showed a mean barometer lower than 30 inches. The total wind movement was slightly less than the normal, and only a few days showed a large wind movement. The direction of the wind was more varied than usual. The only gales recorded were during the two low barometer periods referred to above.

The mean hourly temperature was more than one and a half degrees below the normal, and the maximum was slightly lower than usual. The minimum temperature was not as low as usual and was registered before the middle of the month.

The mean dew point and relative humidity were both comparatively low.

The total precipitation was nearly fifty per cent above the normal, and nearly one-half the total fell on one day. The snow which fell was soon melted, so that the ground was bare when the month closed.

Two-thirds of the days were either cloudy or overcast, and the amount of sunshine was very small.

J. E. OSTRANDER, Meteorologist.

H. W. POOLE, Observer.

BULLETIN No. 384. DECEMBER, 1920

Meteorological Observations

AT THE

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Latitude, 42° 23′ 48.5″ N. Longitude 72° 31′ 10″ W.

Height of barometer above ground, 51 ft. Above sea level, 273.5 ft.

Height of Wind Instruments 72 ft. Time used, 75th Mer.

MONTHLY SUMMARY.

Pressure. In inches.

Maximum reduced to freezing,	30.27, 26th, 9 A
Minimum reduced to freezing,	29.04, 2d, 4 A
Reduced maximum reading	30.60, 26th, 9 A
Reduced minimum reading,	29.35, 2d, 4 A
Mean semi-daily reduced	29.962
Monthly range	1.25

***Air Temperature.** In Degrees Fahr.

Highest	58.0, 14th, 6 P
Lowest	4.0, 26th, 9 A
Mean hourly	30.7
Mean of means of max. and min.	31.0
Mean sensible (wet bulb)	26.8
Monthly range	54.0
Highest mean daily	45.4, 14th
Lowest mean daily	11.0, 26th
Mean maximum	37.9
Mean minimum	24.1
Mean daily range	13.8
Greatest daily range	25.0, 14th
Least daily range	5.0, 22d

Humidity.

Mean dew point	21.5
Mean force of vapor	.166
Mean relative humidity	73.7

Precipitation. In inches.

Total precipitation, in inches	6.02
Total snow, in inches	7
Number of days on which .01 inch or more rain fell	9
Days of Sleighing,	5

*Temperature in ground shelter.

**Reduced to freezing and sea-level.

Wind.

Total movement	5280 m
Greatest daily movement	419m, 6th
Least daily movement	22m 13th
Mean daily movement	170m
Mean hourly velocity	6.7 m

Maximum pressure per square foot, 10.0 lbs= 45m per hour, 2d, 1P, W.N.W.

Maximum velocity for 5 minutes, 32m per hour, 2d, 2 P, W.N.W.

Prevailing direction, Northwest.

Summary.

North Northeast	13 per cent.
West Northwest	19 " "
South Southwest	10 " "
Northwest	23 " "
North	13 " "
Other directions	22 " "

Weather.

Mean cloudiness observed	57 per cent
Total cloudiness recorded by the Sun Thermometer	140 hours = 49 per cent.
Number of clear days	5
Number of fair days	14
Number of cloudy days	12

Bright Sunshine.

Number hours recorded, 143 hrs, = 51 per cent.

Rain, 1st, 3d, 4th. 5th, 10th, 13th, 14th, 22d, 23d, 27th.

Snow, 5th, 9th, 10th, 16th. 22d, 27th.

Sleet, 27th.

Gales. 45m. 2d, W.N.W.; 40m, 6th, N.W.

DAILY SUMMARY.

Day.	Barometer Reduced to Sea Level.			Temperature. Ground Shelter.							No. Hours of Bright Sunshine
	Maximum	Minimum.	Mean, Semi-daily	Maximum	Time.	Minimum.	Time.	Mean of Max. and Min.	Mean Hourly Draper.	Mean Sensible Wet Bulb.	
1	30 33	29.41	29.875	36.0	12 P	28 5	0 A	32.3	31.9	30.0	0.0
2	30.11	29 35	29 693	45.0	1 P	32.0	12 P	38.5	38.0	31.5	2 5
3	30.29	30.08	30.210	36.0	2 P	26.0	7 P	31.0	31.9	28.0	6 3
4	30.09	29.95	30.051	46.0	3 P	33 0	6 A	39 5	37.2	33.5	7.0
5	29 95	29.37	29 493	49.0	4 P	34.5	3 A	41 7	40.4	37.0	1.5
6	29 87	29.54	29 701	42.0	0 A	30.5	12 P	36.3	36 4	31.5	1.5
7	30.10	29 87	29.976	39.0	2 P	27.0	12 P	33.0	31.9	27.5	7.4
8	30.37	30.10	30.319	39 0	3 P	20.0	7 A	29.5	27.7	22.3	8.4
9	30.36	30.07	30.280	35 0	5 P	21.0	3 A	28.0	28 8	27.0	2.0
10	30.07	29.60	29.783	37.0	4 P	30.5	9 A	33.7	33 0	30.5	1.6
11	29.91	29.58	29.756	37.0	3 P	28.0	12 P	32.5	32.9	30.3	6.0
12	30.20	29.91	30.108	46.0	3 P	23 0	7 A	34.5	31.0	23.7	8.2
13	30.30	30.20	30.261	35.0	4 P	23.0	5 A	29.0	29.7	28.5	0.0
14	30.19	29.40	29.641	58.0	6 P	33.0	0 A	45.5	45.4	43.5	0.0
15	29.59	29.45	29 515	46.0	0 A	33.0	12 P	39.5	39.2	32.5	4.7
16	29.58	29.50	29.532	38.0	3 P	29 0	7 A	33.5	32 8	28.3	5.7
17	29.50	29.46	29.497	35.0	4 P	27.0	8 A	31.0	31.0	26.5	6.5
18	29.91	29.53	29.732	35.0	3 P	26 0	2 A	30.5	30.3	27.0	6.5
19	30.13	29.44	30.094	35.0	2 P	24.0	7 A	29 5	29.4	23.7	6.0
20	30.36	30.13	30.288	37.0	3 P	16.0	7 A	26.5	25.6	20 0	8 0
21	30.48	30.36	30 444	36.0	3 P	16.5	7 P	26 3	26.3	22.0	8.0
22	30.47	29 92	30.273	31.0	12 P	26.0	2 A	28 5	28.7	27.7	0.3
23	29.92	29.59	29 684	45 5	5 P	31.0	0 A	38 3	37.5	35.0	3.0
24	30.04	29.78	29.929	39.0	0 A	27.0	12 P	33.0	33.2	30.0	6.1
25	30.45	30.04	30.288	29 0	2 P	11.0	12 P	20.0	22.1	16.3	8.3
26	30 60	30.39	30.536	16.5	2 P	4.0	9 A	10 3	11.0	6.7	5.0
27	30.39	29.73	29.062	23.5	5 P	13.0	3 A	18.3	18.1	17.3	0.0
28	29.94	29.74	29.888	33.5	5 P	18.0	12 P	25.7	28.2	23.5	6.0
29	30.04	29.92	29.990	33.5	3:30 P	10.0	9 A	21.7	21 2	15.3	7.2
30	30.03	29.90	29.981	40.0	2:30 P	25.5	2 A	32 7	31.9	29 0	7.5
31	30.20	29.87	30 052	40.0	1 P	19.0	12 P	29.5	30.2	25.3	2.0

DAILY SUMMARY.

Day.	Humidity.			Wind.					Precipitation.			
	Mean Dew Point.	Mean Force vapor.	Mean Relative Humidity	Prevailing Direction.	Total Movement in Miles.	Maximum Pressure Per Square Ft	Miles per Hour.	Time.	Beginning.	Ending.	Total in Inches. Rain.**	Snow.
1	28.0	.176	89.5	N.	90	0.0	—	—	1 A	10 P	.93	
2	24 0	.210	63 5	N.W.	393	10.0	45	1 P				
3	23.5	.167	78.0	W.S.W.	110	0.0	—	—	8 P	11 P	.10	
4	29.5	.213	73.5	S.W.	63	0.0	—	—	0 A	12 M	1.71	
5	33 5	.242	80.0	N.W.	165	4.0	28	3 P	9 A	10 A	T	T
6	24.5	.204	64.0	N.W.	419	8.0	40	3 P				
7	21.5	.170	68.5	N.N.W.	260	3.5	26	6 P				
8	15.5	.133	67.0	N.N.E.	207	2.5	22	2 A				
9	22.0	.162	73.5	N.N.E.	307	3.0	24	7 P	7 P	10 P	T	T
10	27.5	.180	84.5	N.N.E.	188	1.0	14	11 A	9 A	12 P	.13	1
11	27.0	.180	82.0	N.W.	225	3 0	24	8 A				
12	16.0	.148	62.0	W.N W.	42	0 0	—	—				
13	24.0	.170	78.0	W.N.W.	22	0.0	—	—	8 P	12 P	.10	
14	42.5	.297	92.5	S.S.W.	229	5.5	33	3 P	0 A	12 P	1.56	
15	29.0	.205	77.5	S.W.	212	3.5	26	7 P				
16	23.5	.170	76.5	S.S.W.	172	0.5	10	2 P	8 P	11 P	T	T
17	22 5	.157	78 0	W.	76	0.0	—	—				
18	22.5	.162	78.0	W.N.W.	169	2.0	20	3 P				
19	16.0	.146	63 0	W.S.W.	128	0.0	—	—				
20	13.5	.125	68.0	N W.	75	0.0	—	—				
21	16.0	.131	70.0	N.W.	93	0 5	10	2 P				
22	26.0	.158	92.0	N.	44	0.0	—	—	5 P	12 P	.20	T
23	32.0	.224	83 0	N.W.	149	2.5	22	10 P	0 A	11 A	.24	
24	28.0	.175	89 0	W.N.W	356	4 0	28	10 A				
25	9.5	.103	67 0	N.N.W.	295	4.0	28	11 A				
26	−7.0	.070	46.5	N.N.E.	107	1.0	14	10 A				
27	12.5	.106	75.5	N.	157	0.5	10	3 P	1 A	6 P	1.05	6
28	14.0	.145	64.5	W.N.W.	209	3.0	24	6 A				
29	3.0	.107	51.0	S.S.W	93	1 0	14	6 P				
30	24 5	.176	75.0	W.N.W.	111	0.5	10	10 P				
31	21.5	.135	79.5	N.	114	2.0	20	4 P				

**Rain or melted snow at base of tower. * Included in following day.

Annual Summary for 1920.

Pressure. In inches.

Maximum reduced to freezing, ... 30.71, Feb. 1st, 10 A.
Minimum reduced to freezing, ... 28.72. Mar. 13th, 5 P.
Maximum reduced to freezing and sea-level, ... 31.05, Feb. 1st, 10 A.
Minimum reduced to freezing and sea-level, ... 29.03, Mar. 13th, 5 P.
Mean semi-daily reduced to freezing and sea-level, ... 30.004
Annual range, ... 2.02

***Air Temperature.** In degrees Fahr.

Highest, ... 92, Aug. 8th, 2:30 P.
Lowest, ... —18.0, Feb. 1st, 7 A.
Mean hourly, ... 46.4
Mean of means of max. and min., ... 46.8
Mean sensible (wet bulb), ... 42.2
Annual range, ... 110.0
Highest mean daily, ... 76.4, Aug. 9
Lowest mean daily, ... —4.7, Jan. 3
Mean maximum, ... 57.1
Mean minimum, ... 36.6
Mean daily range, ... 20.5
Greatest daily range, ... 44.0, Oct. 7
Least daily range, ... 3.5, Feb. 26, Apr. 2d

Humidity.

Mean dew point, ... 38.7
Mean force of vapor, ...372
Mean relative humidity, ... 79.2

Wind.

Total movement, ... 51,470 m
Greatest daily movement, ... 537 m., Mar. 6
Least daily movement, ... 0 m., Oct. 6
Mean daily movement, ... 141 m
Mean hourly velocity, ... 5.9 m
Maximum pressure per square foot, 16.0 lbs., 57 m. per hour, Mar. 6, 10:30 A., N.W.
Maximum velocity for 5 minutes, 40 m. per hour, Oct. 1, 2 A. S.S.W.
Prevailing direction, ... West.

Summary.

South Southwest . . . . . 16 per cent
South . . . . . 10 " "
West Northwest . . . . . 11 " "
North . . . . . 9 " "
North Northeast . . . . . 9 " "
Other directions, ... 35 " "

Precipitation. In inches.

Total precipitation, rain or melted snow, . 50.09
Snow total in inches, ... 78.00
Number of days on which .01 or more rain or melted snow fell, ... 135

Weather.

Mean cloudiness observed, ... 51 per cent.
Total cloudiness recorded by Sun Thermometer, ... 1795 hrs.=40 per cent.
Number of clear days, ... 118
Number of fair days, ... 156
Number of cloudy days, ... 92

Bright Sunshine.

Number of hours recorded, 2662 hrs.=60 per cent.

Dates of Frosts.

Last, ... April 26th
First, ... Oct. 7th

Dates of Snow.

Last, ... April 8th
First, ... Nov. 12th
Total days of sleighing, ... 79

Gales of 50 or More Miles Per Hour.

Mar. 6th, 57m., N.W.

Temperature in ground shelter.

H. W. POOLE,
Observer.

J. E. OSTRANDER,
Meteorologist.